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OS 1.2 and Basic II

A Database Publication

electron user

Vol. 3 No. 2 November 1985 £1

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Karate**
—full listing

**How to fake
Mode 7**

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smashes
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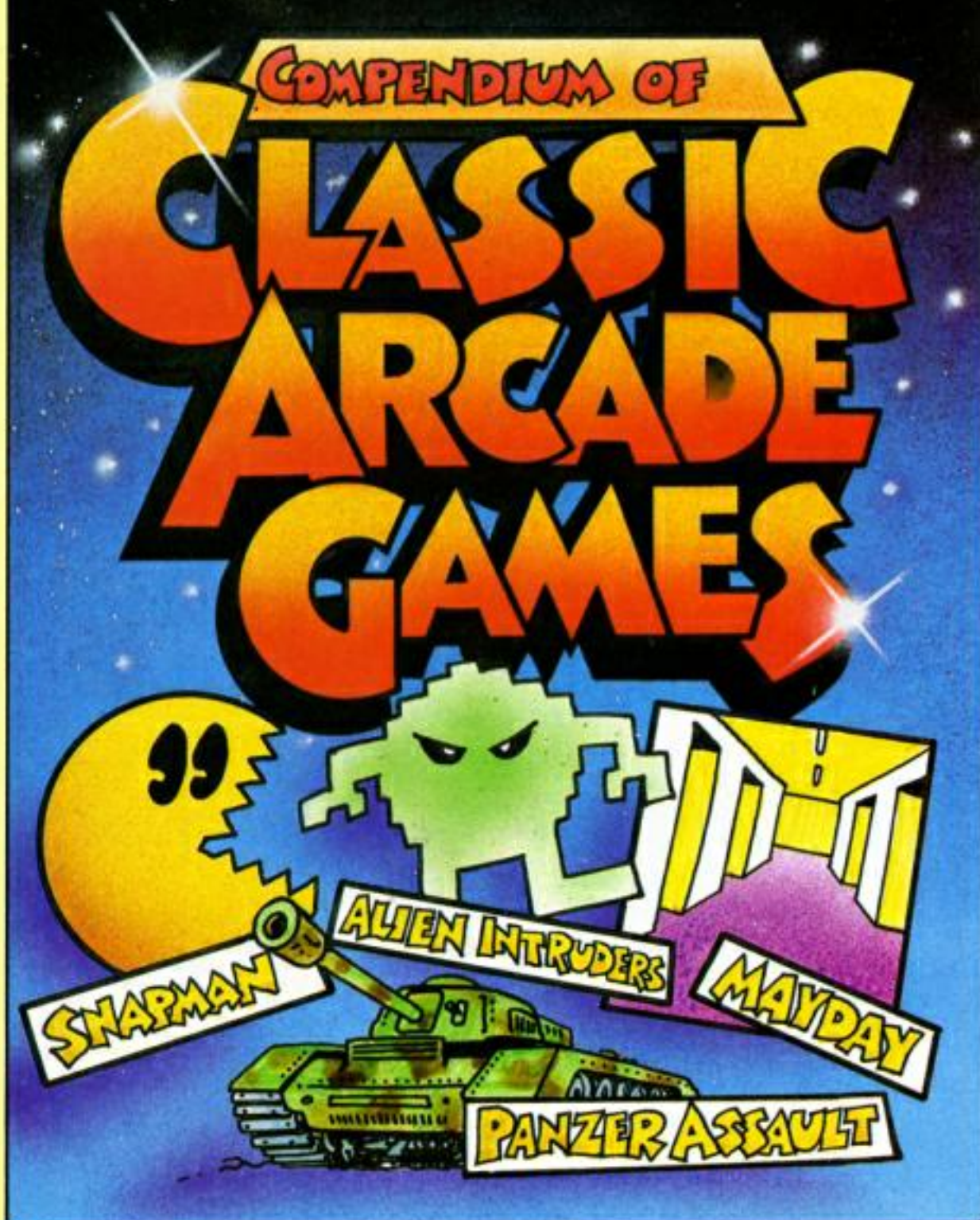
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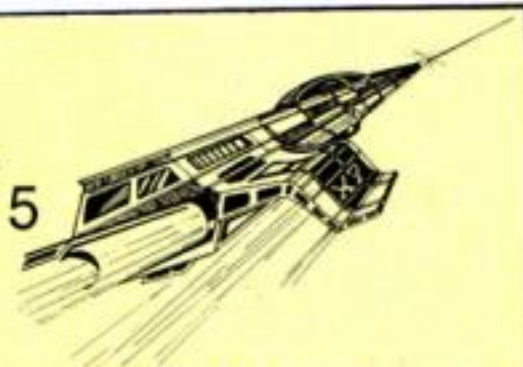
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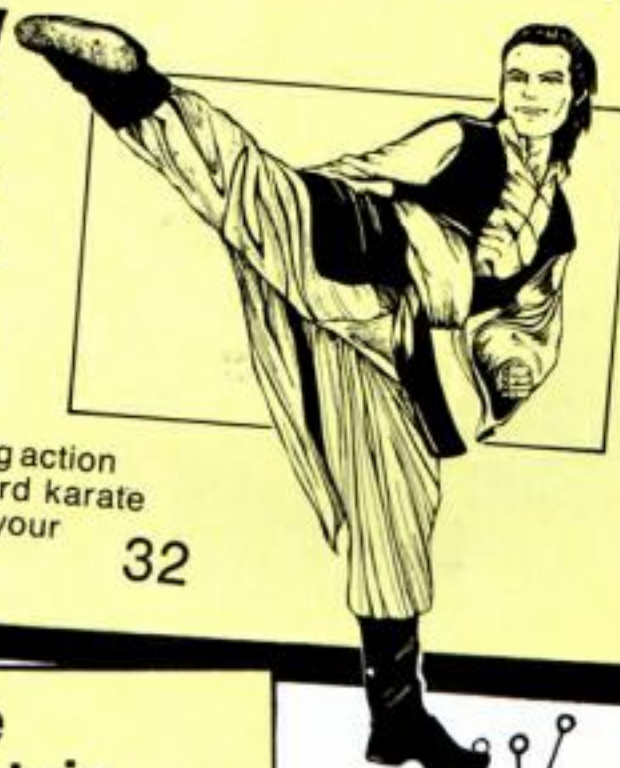
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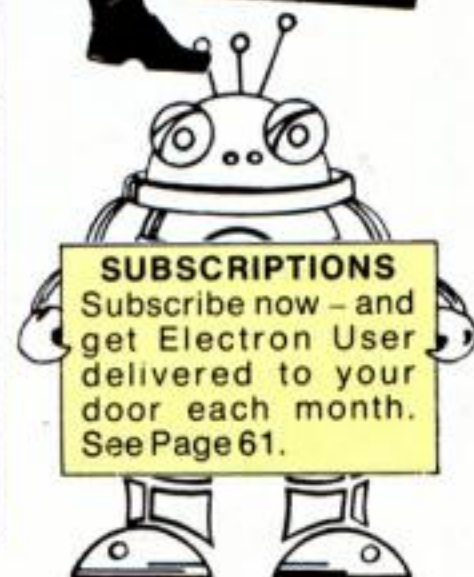
Sum it up and reach the summit.

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Order form

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electron user NEWS

New Zealand breakthrough

A BREAKTHROUGH has been achieved by the Electron on the educational front in New Zealand.

The town of Wanganui, population 33,000, on the west coast of North Island has introduced the machine as a teaching aid into its primary schools.

The experiment is being watched with keen interest by the educational establishment out there, for local authorities in New Zealand are free to select whichever machine they see fit – and this is the first time the Electron has come to the top of the pack.

It beat off challenges from both Atari and

Apple machines, but did have a little help from its big brother, the BBC Micro, which is already established in Wanganui's high schools and colleges.

"We see the move as a logical extension to the introduction of the BBC Micro here", Colin Clancy, deputy principal of Wanganui's Girls College, told *Electron User*.

"The Electron is seen here as a stepping stone at primary school level to introduce the younger children to the world of the micro.

"It may well be that the link between the Electron at the primary level and the BBC Micro at secondary may catch on in the rest of New Zealand".

DIXONS IN PRE-XMAS COUP

A LEADING UK retail chain has pulled off a major pre-Christmas coup by buying up almost all Acorn's available stock of Electrons.

The top secret deal has enabled Dixons, the High Street giant, to dramatically slash the price of the machine for the profitable run up to the festive season.

It is now offering the Electron bundled with a cassette recorder and software for £99.95.

Although officials of both Acorn and Dixons refused to reveal just how many Electrons are

involved, sources for both sides admitted the numbers are very substantial.

"We expect to sell a lot of Electrons on the run up to Christmas", Egon von Greayez, Dixons' financial director told *Electron User*. "It is the right machine now at the right price".

Another High Street chain – W.H. Smith – claims to be having

difficulties in buying Electrons from Acorn.

"We'd been selling quite a few recently as a package promotion", said John Rowland, the company's merchandise controller, "but when we tried to buy some more I had a problem finding anyone to talk to me about the Electron at Acorn.

"Then came the news of the Dixons deal".

ELECTRON PRODUCTION CONTINUES

THE future of the Electron is assured, and that's official.

In his first interview since taking on the job of breathing life back into Acorn, new managing director Brian Long gave his assurance to *Electron User*: "We are not ceasing production of the Electron".

In answer to stories in the computer trade press that Acorn had virtually written off the machine, Long said it was true his company was not ordering Elec-

trons from its suppliers at the moment.

"Some are still being built to satisfy future demands", he said.

Long maintained that current trade stocks were adequate. "We have not yet made any decision on further orders because of the difficulty predicting demand".

And he added: "We have enough Electrons in stock to meet the needs of retailers throughout the Christmas period".

Long described as rubbish claims in the trade press that there are currently no personnel left at Acorn with responsibility for the Electron.

When asked if *Electron User* could assure its readers that the machine will be supported by Acorn in the foreseeable future he replied: "Of course".

Not too long ago a senior Acorn executive was quoted as saying the Electron would be used for more serious

applications.

Asked if this still held true, Long said: "Very definitely, yes". And he pointed to the machine's popularity among original equipment manufacturers such as BT Merlin.

Although still settling into the top job at Acorn, Long took time off to reassure Electron owners through the pages of *Electron User*.

And he promised to reveal more details of his plans for the machine in the near future.



Brian Long... "We are not ceasing production of the Electron"

Mentally handicapped get a helping hand

CUSTOM - designed software for the Electron that is helping to teach mentally handicapped people all over the world is being produced by New Horizon Computer Services, a company set up by mechanical engineer David Regan.

The programs, which are being used as far apart as South Africa and the Shetland Isles, are also suitable for the educationally subnormal, and in some cases for infant and primary schoolchildren.

To date more than 20 special programs have been produced, originated by teachers, instructors and parents who provided Regan with the broad outline of their particular requirements.

New Horizon supplied the programming



One of the new programs in use

expertise and customising of the programs, and field testing was undertaken on as broad a base as possible to make the programs suitable for special schools, adult training centres and, where possible, home use.

The programs range from simple graphic

responses on touching the keyboard, through serious educational programs to games for hand and eye coordination.

Most of the programs are multi-level and automatically follow the progress of the user, either increasing or decreasing the level of difficulty.

A special feature is their "minimum negative reinforcement" which is designed to offset a mentally han-

dicapped person's inability to recognise a "wrong" move from a "right" one, as all action on the screen appears entertaining and rewarding to them whichever key is pressed.

Regan says one of his main problems is to get educators to appreciate the difference between his programs and those used in ordinary schools.

"Screen appearance is not always pleasing to the non-handicapped", he said: "For example, clouds are created on screen, figures are cartoon style, but these are often the areas of initial interest to the mentally handicapped."

"Screen layouts are deliberately kept very simple, as too much detail causes confusion".

Regan's programs are supplied on either cassette or an autobooting disc with menu selection of program. There is no protection applied to discs or

cassettes.

"We encourage the making of back-up copies", said Regan. "Advice and assistance is available by phone".

He is now looking for ideas and finished programs to extend his range.

"We pay modest royalties of between 10 and 25 per cent of sales value to the originator" he said.

"We would also like to hear from holders of the copyright on past popular games if they are willing to allow or assist us to produce simplified versions of their programs".

Another innovation of Regan's that will help the mentally handicapped, and young children, is the production of lower case keys for the Electron keyboard to replace the capital letters which beginning learners are often unfamiliar with.

The new keys will be available shortly.



Top selling Electron programs

Compiled for every month
for *Electron User*
by Terry Blood Distribution Ltd.

- 1 **Overdrive**
Superior
- 2 **Death Star**
Superior
- 3 **Bobby Charlton Soccer**
DACC
- 4 **Micro Olympics**
Database
- 5 **747**
Dr Soft
- 6 **Brian Jack Superstar Challenge**
Software Communications
- 7 **Repton**
Superior
- 8 **Mini Office**
Database
- 9 **Sim**
C.S.M.
- 10 **Caveman Capers**
Icon

NATIVITY COMPETITION

ELECTRON owners have been invited to help fill a gap in our national heritage caused by the likes of Henry VIII and Oliver Cromwell.

Because of these and other iconoclasts, there is no British history of Nativity art as there is in other European countries.

But that is something archivists and historians Count and Countess Andrzej von Stauffer intend to correct.

They have organised the first British National Nativity Competition to put Britain alongside the other countries of the world who already have a longstanding tradition

regarding the Nativity.

It coincides with the 12th World Congress of Nativitists, which is hosted by a different country every three years and this year is at Innsbruck, Austria, in December.

The competition, in two parts, will be held at Westminster Cathedral on December 8 and at the Christian Resources Exhibition at the Horticultural Halls in London on February 8.

Epson UK, was involved in the Christmas Archives Exhibition "Folk Nativities of the World" at the Barbican Centre last winter.

The Epson connec-

tion with the national Nativity competition is in the special category for the best computer-generated image of the Nativity.

Any part of the Christmas story may be represented, and entries will be judged on originality, content and approach.

Epson will judge this section of the competition and award a prize to the winner.

Electron owners who want to enter the competition should write to National Nativitists Competition, Christmas Archives, 64 Severn Road, Cardiff CF1 9EA enclosing a 24p stamp.

Still in the air

AIMING to repeat the success of its chart topping 747 program Doctor Soft stays in the air with Phantom Combat for the Electron.

In addition to the usual flight simulator features, the 3D outside view is enhanced by computer drawn and flown delta aircraft outlines, permitting formation flying and combat.

Written by a professional pilot and a military flight simulator software engineer, the program has a "simulator inside a simulator" mode where target aircraft are controlled from separate keys.

One or two analogue sticks can be used or full key controls.

TV campaign

SOFTWARE promoter Beau-Jolly says it is spending £250,000 on a national TV campaign for its compilation packs, including one for the Electron.

Computer Hits contains a variety of games, adventure, arcade, sports simulation and strategy software – a total of 10 programs – and costs £9.95.

Breakthrough boosts Electron speed

A TECHNOLOGICAL breakthrough giving the Electron greater BBC compatibility has been achieved by Advanced Computer Products.

The firm has manufactured an interface which connects the Electron to the Acorn second processor, giving an extra 64k of memory.

The interface plugs into the Plus 1 and allows the user to attach an Acorn 6502 second processor.

"The dramatic increase in speed of operation means that to run a simple pattern, say, takes about four seconds where before it used to take 12 seconds", ACP's John Huddleston told *Electron User*.

"It is early days yet to talk about availability. We are looking at the potential market for the interface at the moment.

"One of the problems is that it is a £200 plus device for a machine that is currently being sold for less than £100. But if we can see a demand for the product we could have it on the market before Christmas", he added.

Other enhancements ACP is working on for the Electron include a 1MHz bus, a user port and a universal eeprom programmer.

"All these, with the interface, give the Electron more possibilities and bring it much nearer to BBC compatibility", said Huddleston.

He said his company also has plans for a more compatible disc interface which can incorporate the 1770 DFS. Huddleston said ACP is

committed to continuing support of the Electron. "Companies who have lost confidence in the machine as a result of Acorn's recent financial troubles have got it all wrong", he said.

"No matter what, there are a large number of Electrons out there and sales are going well".

"Also the current trend of multiples entering the marketplace means there will be an awful lot more by Christmas.

"Electron users will be expecting backup and we aim to give it. Other major manufacturers involved in supplying products for the Electron feel the same way. The Electron is here to stay".

Educational software is off to a good start

THE new organisation aimed at making educational software more readily available to Electron users has got off to a flying start.

British Educational Software Associates has already signed up

150 "serious stockists" – computer dealers who will stock BESA's core list of 40 programs and

will be able to meet orders for another 200 plus titles within 48 hours.

The group's target of 200 retail outlets is likely to be met by the end of the year according to Craig Thatcher of distributor Proteus, the man in charge of BESA's dealer recruitment.

In common with *Electron User's* ongoing campaign to get more educational software on to retailers' shelves, BESA intends to encourage dealers to stock more of this type of program and aggressively promote public awareness of its availability.

Founder members of the group are Applied Systems Knowledge, Bourne Educational Software, Calpac Computer Software, Collins Software, Griffin Software, Hill MacGib-

bon, MacMillan Software and Widgit Software.

"More publishers will be joining us in the new year", says Thatcher.

"There has been an overwhelming response to BESA throughout the industry and we have had contact already with many other Electron educational software producers who want to contribute to our range.

"In particular we shall be focussing on programs that combine education with entertainment. We want to get away from what I call the 'chalk dust stuff' – educational programs so dull and boring they turn youngsters off.

"If we can get the right sort of quality product I believe educational software for the Electron will really take off in the next few months".

Changes at the top

ACORN has undergone a top level management reshuffle in the wake of Olivetti increasing its grip on the company to almost 80 per cent.

The major shake-up was announced at the extraordinary general meeting called to endorse the rescue package.

It saw the Italian based multi-national acquire 400 million new ordinary Acorn shares for £4 million.

Out goes chairman Dr Alex Reid, the former British Telecom senior executive, to be replaced by Olivetti man

Alessandro Ubaldi.

Out go co-founders Dr Herman Hauser and Christopher Curry as deputy chairmen but retain their seats on the board.

Out goes Peter Wynn from the board, but he continues as group finance director.

In comes Bruno Soggiu as an Olivetti appointee to the board and non-executive director.

Making his final statement as chairman at the meeting, Dr Reid endorsed a previous forecast that Acorn will achieve £20 million in

sales during the second half of this year against £55 million for the same period in 1984.

In the second quarter of this year, it was revealed, the company's turnover had been at 30 per cent of last year's level.

It was left to Dr Reid to point out to shareholders that if it had not been for the Olivetti rescue package, Acorn would have faced the prospect of "imminent receivership".

The meeting was told that the company has now embarked on a cost-saving plan.

SOLIDISK EFS COMBINES DISC AND A SOCKET FOR THE WI

Solidisk Double Density DFS is now the ultimate in reliability and supported by the largest amount of software available for the Electron.

Solidisk relies on a good product and a large support network to win the heart of the user.

With over 75 Local Experts, covering England, Scotland and Wales, Solidisk can offer many users regional free fitting and advice.

With an ever increasing catalogue of free software, even users who are new to the Disc system can expect to build up a large library in a fairly short time.

Solidisk Software Support Service already has responsibility for over 50,000 BBC computer users and the ability to give you the best service matched only by the largest companies.

Solidisk Double Density DFS handles both BBC Discs and Electron Discs, in single and double density whereas the Acorn's PLUS 3 can only handle ADFS discs.

Solidisk ADFS has nice features such as automatic disc format sensing, built-in disc formatter and verifier and programmable disc speed.

It also has more than 20 disc utilities built into the ROM.

Standard features for both BBC DFS and ELECTRON ADFS implementations include:

1) Automatic Write Error Correction.

2) Automatic 40/80 track stepping, the ADFS 2.1 will let you read and write 40 track discs if you have an 80 track drive.

3) Disc repair facilities.

Disc sector editor (*DZAP), memory editor (*MZAP), recover good sectors (*RECOVER) rewrite multiple sectors (*RESTORE), read bad sectors and bad track (*RTRACK), repair and restore bad sectors and track (*WTRACK) and the powerful disc copy (*DCOPY) which is capable of duplicating even some non BBC discs.

4) Tape to disc facilities.

Direct transfer from tapes to disc (*TAPEDISC) will work with all unprotected programs. *TAPELOAD and *TAPESAVE will cope with more difficult ones. Only in some cases (multipart games cassettes) will you need Solidisk tape copier.

5) Wordprocessing facilities.

This facility allows *BOOT and other text files to be edited, saved and printed in any screen mode.

6) Automatic disc format sensing.

On Shift-Break, the STL ADFS 2.1 will detect the disc format and use the right BBC DFS or Electron ADFS to run.

On the Electron ADFS side, the 2.1 ROM also has some very nice features:

1) Extensive Disc formatting facilities.

*FORM40, *FORM80, *FORM160 and *WFORM (for the Winchester) are available to handle any disc drive.

2) Disc verifying facilities.

*VERIFY will check all disc sizes including Winchester for media defects.

3) Number of opened channels.

This is the star feature of Solidisk ADFS.

This facility (*OPEN) allows you to specify how many files will be opened in a program, thus maximising the available RAM while avoiding buffer page swapping as on the Acorn ADFS.

It leaves PAGE at &1900 for most programs, gives more room to View and Viewsheet and avoids unnecessary conversion work for many programs originated for the BBC DFS to be run on your Electron.

On the BBC DFS side, the STL ADFS 2.1 handles both single and double density and in addition, it supports:

1) Unlimited catalogue entries.

2) Unlimited filesize.

THE SOLIDISK 16k SIDEWAYS RAM:

Solidisk Sideways RAM is an almost indispensable add-on for the Electron with disc drives.

The Sideways RAM occupies the same memory area as the BASIC or ADFS ROM in the micro's memory map. This means that Sideways RAM can run almost any ROM type software, including languages, utilities and games.

Sideways RAM is notably invaluable to run games and specially "MEGAGAMES".

Games and programs run at 2MHz clock speed in Sideways RAM, if loaded into the Electron RAM, they can only run at 1MHz clock speed, ie half the speed of Sideways based games.

Megagames are too large to be run on the unexpanded Electron. They use extensively 8 colour high resolution screen (mode 2), background music, sound and

high speed sprites.

Solidisk supply free software to maximise the use of Sideways RAM on the Electron. These include Wordprocessor, Spreadsheet, Database, Toolkit, Machine Code Monitor, Printer Buffer, Sprites, Playtunes, Virtual Memory Processor, VDU Replay, Screen Effects, digitised pictures etc . . .

THE WINCHESTER SOCKET:

Solidisk has the most powerful Winchester system for the BBC computers and the Electron. The Winchester system can provide from 20 Megabytes to a theoretically possible 1300 Gigabytes of storage, directly on line with the Electron.

The same Winchester unit can be used on the BBC B, the BBC PLUS and the Electron without any change.

You can read more about it in BBC Micro User or in Acorn User Magazines. Price of a 20 Megabytes system is only £700.00 + VAT (£805.00).



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- Solidisk EFS Disc Upgrade, 16K Sideways RAM and Winchester socket.
- One software package containing four 3.5" discs, detailed below.
- Full one year guarantee and 2 manuals.

PRICE: £200.00

You can also order as many Megagame Packs at the same time as you like. Each Megagame Pack consists of three 3.5" discs and contains on average 20 games.

THE SOFTWARE:

The software contains everything to start a library: the big four (Database, Wordprocessor, Spreadsheet and Graphic), Utilities and Games.

Database:

Solidisk Database is very easy to understand and use. You are presented with a 15 option Menu. Each option will lead to a new Menu and so on. Mode 3, 80 column screen is used throughout so that what you see is what will be printed on paper. With Solidisk Database, you can create as many records as you like, each record can be up to 15 fields of up to 60 characters. You can sort, search, index, mailmerge, append, create subset, calculate etc. Solidisk use the same Database to process all your orders.

Wordprocessor:

Solidisk Wordprocessor is WYSIWYG type (What You See Is What You Get) and has all the commands of a professional tool. It features 80 column screen, on screen justification, page numbering, search and replace, word count, free space, Wordstar like editing commands: insert and overwrite, block mark, move, copy, delete, save, load to cursor, * commands etc..

Spreadsheet:

Solidisk Spreadsheet is also Menu driven and has the same file

structure as Solidisk Database. You can have as many rows and columns as you like, each column can be as small as two characters wide or as big as 70 characters. All maths functions are



supported. Recalculate, Replicate, Print, Print If, Sort, Search, Define Zone, Mailmerge, Text Input/Output etc... are included.

Toolkit:

Solidisk Toolkit is almost indispensable for Electron programmers, it has 24 star commands (Status, Rwipe, LVAR, Move, Search and Replace, Expand, Salvage, Keyload etc...).

ORDER FORM

PRICE LIST and ORDER FORM.

	Price	P&P
Diskettes.		
Verbatim 3.5" box of 10	£40.00	£1.00
Software Pack	£10.00	£1.00
Solidisk EFS	£59.00	£1.00
Disc Offers.		
640k Mitsubishi MF453 Disc Outfit	£200.00	£3.00
1.3 MB Fantastic Offer	£310.00	£3.00
20 MB Winchester system	£805.00	£10.00
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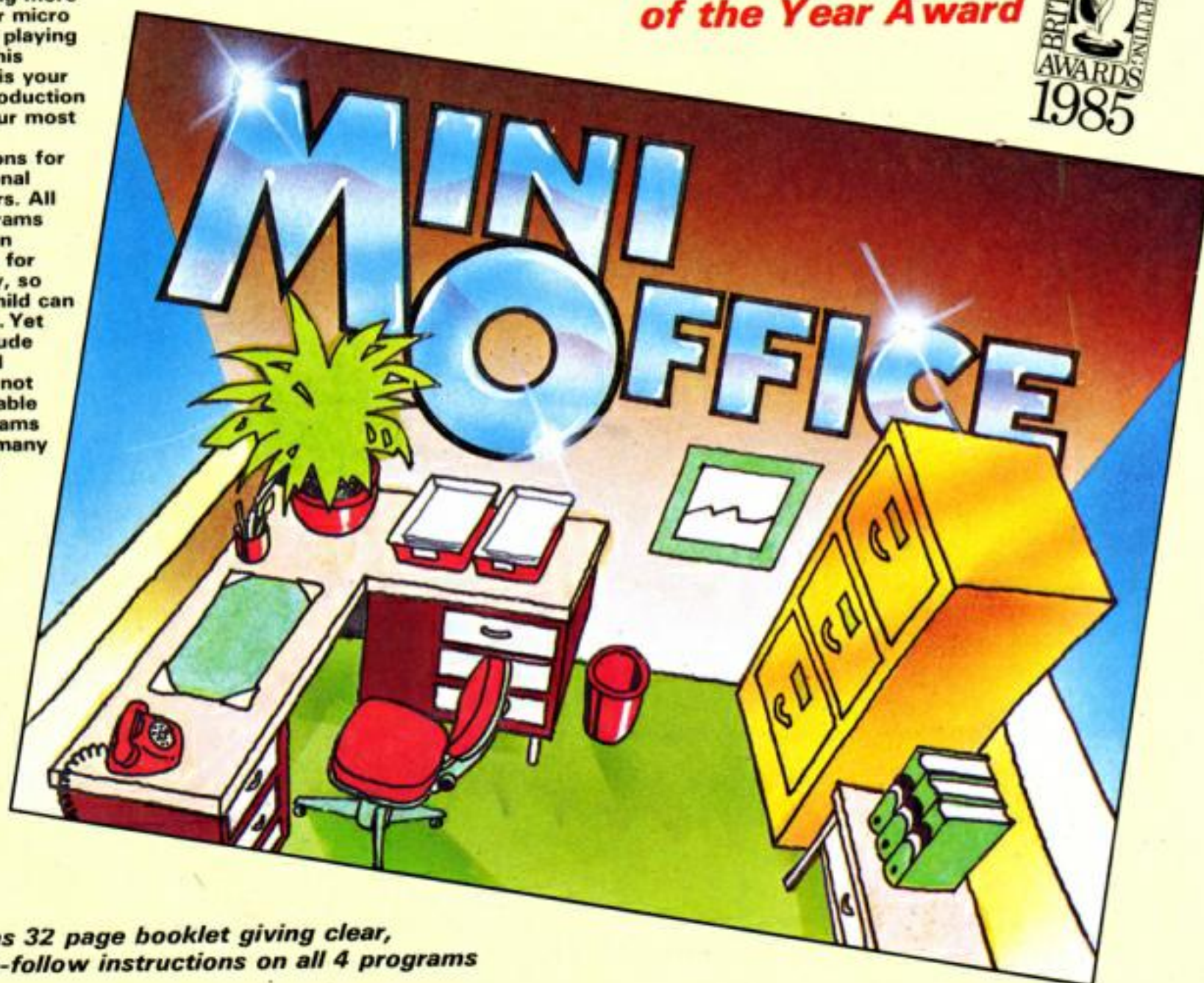
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We reserve the right to change specifications and prices for improvements.

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

**Finalist for the Home Software
of the Year Award**



**Contains 32 page booklet giving clear,
easy-to-follow instructions on all 4 programs**

Word Processor: Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode – perfect for young children and people with poor vision.

Database: You use this for storing information, just like an office filing cabinet. Facts you have entered can be quickly retrieved by just keying in a word or part of a word. They can be sorted, replaced, saved for future use or printed out.

Spreadsheet: Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program...

Graphics: Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the duller figures!

★ Word Processor
★ Database

★ Spreadsheet
★ Graphics

**Now they're
all together -
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Software Surgery

THE COLUMN THAT TAKES A LOOK INSIDE THE LATEST RELEASES

Death Star's dead clever

Death Star
Superior Software

DEATH Star is a super fast, all action arcade classic. It's the sort of game that you can't put down.

You've got to have just one more go. My dinner went cold on more than one occasion.

As the name suggests, the action takes place out in space. Among the asteroids are two types of alien ships – workers and warriors.

The workers are a pretty harmless bunch, but the warriors can be nasty at times.

The asteroids contain valuable crystals which can be blasted free and picked up by both you and the aliens.

The aliens use them to build the Death Star, a huge battle ship, virtually indestructible. You convert them into star-bombs, the only defence against the Death Star.

If you manage to make it until the Death Star has been completed then the only way to survive is to release all your starbombs.

If you've managed to collect enough the Death Star will be destroyed. If not, it'll catch up and crush your ship.

Destroying the Death Star takes you on to the next screen. The warriors harrass you more and it's difficult to mine the asteroids for crystals.

If you manage to destroy the Death Star again it's into warp drive and off to the next screen.

As you progress the number of asteroids become fewer and they become more difficult to mine. To make matters worse, the warriors become more aggressive as well.

The graphics are excellent



and the scrolling is very smooth in all four directions. The pace is fast and furious even on the starting screen.

This action packed game is recommended for all arcade gamers.

Roland Waddilove

Manic fun in the mine

Mineshaft
Durell Software

WE'VE all heard about a manic character who has been very popular on other micros and many people have wondered whether such a game was available for the Electron.

The search is now over because Durell have come up with Mineshaft.

Your job is to collect the coal that has been left scattered about in each of 20 different rooms and then make your way to the next room.

The controls are simple – just left, right and jump – which makes the game easy to learn.

Like all good games though, it's a tough one to master. There are many problems to overcome. These range from water drops to furnaces and

from mutant matches to mine trucks.

To make matters worse you're running out of air and some of the jumps you have to perform are, to say the least, near suicidal.

As you learn the game you'll probably need the three lives you are given for each level but with practice some screens become possible.

Having said that, 'The Impossible Screen' still beats me but my son, aged 8, says it's easy.

All the rooms have interesting names such as The Pink Grotto or Ghosties Revenge.

Should you manage to complete all 20 screens you start again, but due to your state of exhaustion you use your air more quickly.

Technically the game is



excellent, with smooth flicker-free graphics which make good use of Mode 5 colour but are also quite clear in monochrome.

A very pleasant rendition of Greensleeves is available as an option but there is no other sound.

A particular plus with Mineshaft is that by pressing Escape you move on to the next screen with a full set of lives again.

Just occasionally though, the program is seized by a little devil who covers the screen with blobs. Pressing Escape seems to sort out this problem

however.

In short, Mineshaft is a quality game which is simple in concept but absolutely addictive. Strongly recommended.

Rog Frost

Have wheels, will travel

Overdrive
Superior Software

HERE's a game for all you budding world champions out there, just itching to climb into the seat of a fast, powerful car and drive to victory!

In this motor racing simulation from Superior Software you are in control of a potential race-winning car weaving through a seemingly endless field of cars through five different stages – rolling fields, night, snow, desert, and riverside scene.

Sounds easy? Well believe me it isn't. To qualify for each separate stage you must finish within the top 12, which is signified by the bonus going into the blue region of the indicator at the top of the screen.

This is no easy task. To qualify, you will have to compromise between speed and avoiding crashes which will reset your speed to zero, leaving you to start once more the steady acceleration up to a stomach-churning 225 miles an hour to reach the elusive goal.

To add to this the stages get progressively harder with the realistic effect of skidding on the snow and riverside scenes.

The 3D graphic effects are superbly executed with sharply drawn mountains and

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pyramids staying elusively in the distance as your car eats up the miles.

The animation of the cars' movement is smooth and the good use of colours greatly enhances the effect, making your red car easy to pick out among your blue opponents.

The screen display is also very neatly set out with various indicators showing your speed, score and bonus.

However, despite this I do have a few minor criticisms to make. The fact that I was given no option to turn the sound off proved to be quite an annoyance, as when you accelerate and decelerate there are sounds moving accordingly in a chromatic scale.

If you leave your speed constant the sound too remains constant, leaving an



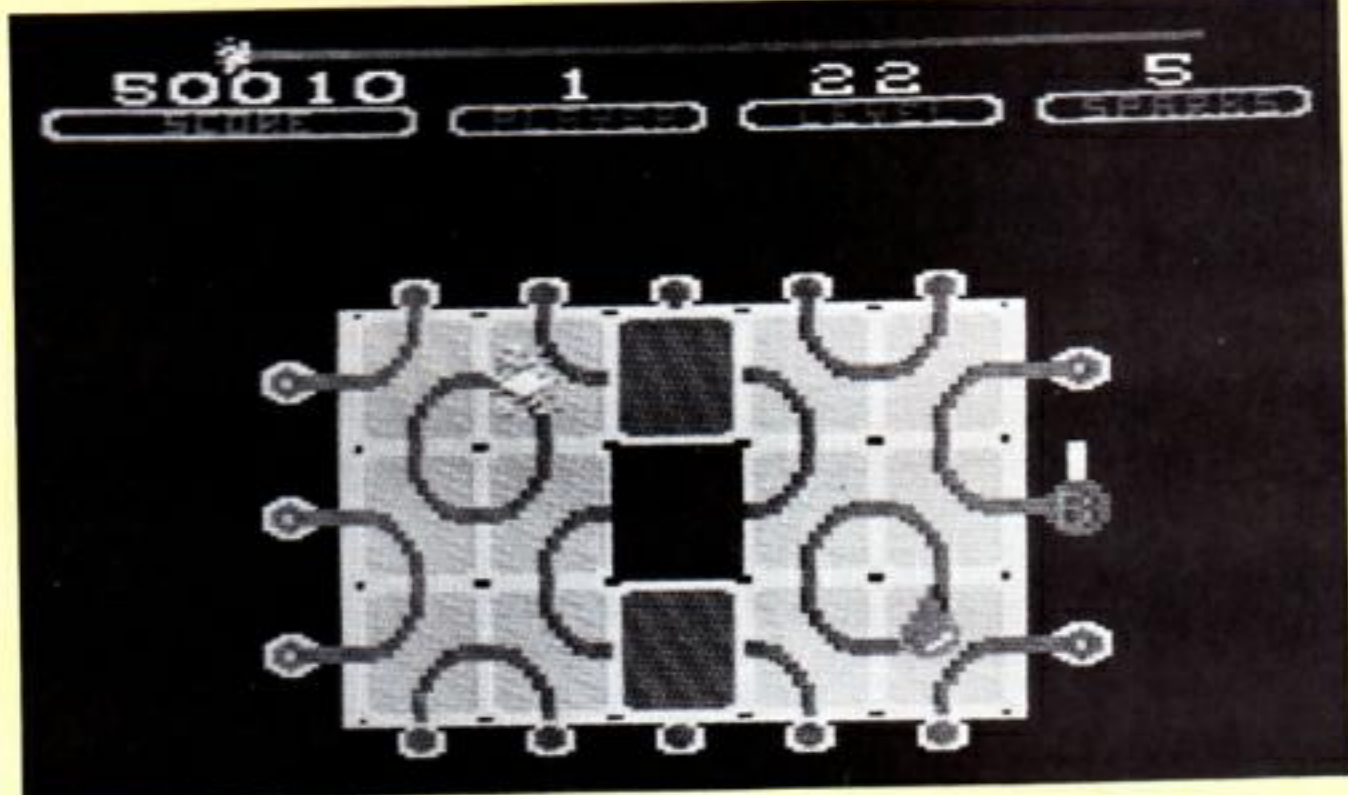
often piercing noise ringing constantly in your ears while you drive.

This is my main criticism although I would have also liked to have seen a few bends to negotiate and would have preferred a name input in the 5-place high score table.

Nevertheless these criticisms do not detract from the enjoyment of the game. Although obviously it does not provide the realism of a steering wheel, the game controls are very simple. There are four keys – Z for left, X for right, * and ? for acceleration and deceleration.

This ease of use and the smooth, well-executed graphics, together with it being, to my knowledge, the only motor racing simulation on the Electron market, make Overdrive well worth a look.

Ian Critchley



Confuzion goes a bomb

WHAT an absolutely brilliant game! Remember, when we were children, how we used to play with those slide puzzles where squares had to be moved around to create a picture?

Well think of that and you've got a good idea of Confuzion.

Dark, evil forces – the editor's friends – have set up a factory manufacturing deadly confuzion bombs.

It's your mission to destroy all 64 levels of the factory by detonating the bombs.

The screen is made up of squares, each containing a section of fuzewire. You have to move these squares about

Confuzion Incentive

so that a spark can travel along the fuzewire to ignite the bomb.

This is not as simple as it might sound. Your spark only has a limited life, as shown by the timer at the top of the screen.

Its life is made even shorter by running into a dead end – no fuze – or off a block into open space.

Later levels become even harder as drops of water – which will extinguish your fuze – fall from the factory's

sprinkler system. Each level becomes progressively harder, with more and more bombs to detonate and more water drops.

The keys are easy to handle and are user-definable. More than one person can play, but there are several common features missing.

There's no sound on or off and no Hall of Fame. But to make up for this you can skip completed screens. And the song on the reverse side of the tape will have you humming along as you play the game.

All in all an excellent game, guaranteed to keep you addicted for hours.

Chris Day

A few bugs down the pit

Caveman Kansas

IT'S no joke being a miner these days – at least not in this offering from Kansas City Systems.

It takes you back to days of yore when gold, diamonds or coal were hewn from the rock

by pickaxe power alone.

There are no boys to help here though. Once you've won your precious load you pull your own truckful back to the paymaster.

That niggardly soul will notice if you haven't filled your truck and will reward you with fewer points.

Life is cheap down the mines. The rather crude arrangement of lifts is unguarded – one false step and you're dead. You can construct your own ladders but, of course, heavy trucks don't go up or down them.

These accursed mines have seven levels and the Trog-lodyte lives on the lowest. Once you're below the first level it relentlessly chases you.

This can be to your

advantage because he dies at the surface. It's too bad that the next generation hatches out on level seven to replace him.

While you dig for gold and diamonds on the first two screens the mine furnace is burning down. That's why coal is needed from the third mine.

There's no pay for coal. The instructions included in the program explain all of this. In fact they are a model that other software houses might look at.

If it all sounds good, don't get too excited. The graphics, while smooth, are very ordinary. You might even call them crude.

Some of the sound is

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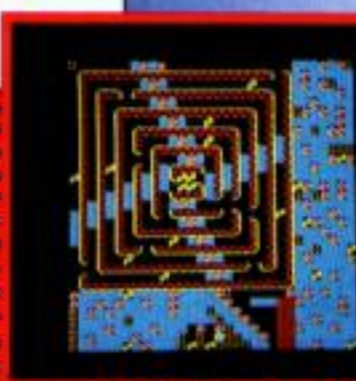
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AN EGG ABOUT TO HATCH



THE MAP (SCREEN H)



SCREEN L

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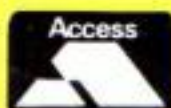
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strange to say the least, although the noise of pick on rock is quite pleasing. There are also odd bugs.

When Troglodyte snuffs it he is not removed from the screen unless some other object moves over him. Also it's possible to fall down non-existent lift shafts.

It's a pity that the cursor keys are used for movement. Apart from being too near Break, they are too cramped up for easy use.

However I could get the game to work with my Plus 1 joystick using the Joyplus program (*Electron User*, March 1985).

Kansas have a good idea here and Caveman is fun to play, particularly in outwitting the Troglodyte. The program suffers from its simple graphics and from a lack of variety in the screens but makes up for it in amusement.

Rog Frost

Boffin has a tricky mission

Boffin
Addictive Games

FOLLOWING the success of Football Manager, Addictive Games has released Boffin. The football game was mainly strategy, but Boffin is pure arcade action.

Professor Boffin must travel through a complex of 20 caves. I'm not sure why, but he will need your help anyway.

The route through each cave is constructed from small ledges. The professor can leap between some of these but others must be negotiated by different methods.

Each cave is littered with numerous unlucky horseshoes. The professor has to collect every one before touching the lucky owl. If you have forgotten any horseshoes then touching the owl isn't so lucky.

Movement consists of left, right and jump. The professor carries an umbrella which can

be raised and lowered.

The broly is very useful when falling from great heights, and can also be used to reach high objects.

As I said earlier, some ledges and even some horseshoes cannot be reached by jumping.

Fortunately the previous inhabitants of the caves were trampolining enthusiasts and they left their equipment. Great heights can be easily reached by bouncing in the centre of a trampoline.

The straight up and down jumps are easy. Judging a trampoline jump sideways to a ledge takes a little more practice.

Additional points can be obtained by collecting petri dishes and tripods. An extra life is awarded for the completion of each screen and for every 50,000 points scored.

A game of this kind would not be the same without the bad guys, though there aren't that many around. The game's real difficulty lay in the actual physical layout of the screen.

The only hazardous character present is an enormous tarantula. This chap is a real humdinger. He is drawn in superb detail and the characteristic jerky movement of such arachnids – not a programming defect – is impeccable.

Another quite daunting creature is the manta-bat. Thankfully these are friendly and can be used as a living escalator when you can't find a trampoline.

The ladders and levels

THE object in this text adventure is to aid King Ardanga, Indomitable Lord of the Fiery Kingdoms.

Somehow, Arfa, the greedy dwarf, has stolen three jewels. What the noble King wants is his treasure returned and the evidence of Arfa's death.

You start at the top of a staircase leading down to the caverns where the dwarf is thought to live and the problems start at once.

Some of these are very straightforward, but it won't be long before you're falling through trapdoors or having stalactites drop on you.

It's a well-written adventure with a fast response time

section of the arcade market is very crowded. Fortunately for Addictive I feel that Professor Boffin has sufficient originality to succeed against all the competition.

Jon Revis

French tutor

Eiffel Tower
Chalksoft

EIFFEL Tower is a program designed to help tourists in France or people studying the French language.

The basic idea is that you are given a French word and you have to type in its English equivalent.

If you get the correct answer a small piece of the well-known Paris landmark is constructed on your screen. If you're wrong the correct answer is given and then you are asked the same question again.

The program ends when you have built the Eiffel Tower, which requires 21 correct responses.

Before the program starts you can choose which of 20 different topics you wish to translate. There are 10 on each side of the cassette.

One of the options is to put in your own sets of words. It's a pity no documentation tells you what the topics are before you load.

This program is really a



disappointment. The graphics are of a fairly mediocre standard. And, as is often the case in educational programs, the noise annoys. Fortunately there is a silent option.

The words – 420 in all – cover a fair vocabulary in basic French and the arrangement of words in groups should aid revision. The graphic reward of the Eiffel Tower would only keep young children happy. It doesn't really tie up with the questions.

There is nothing wrong with the structure of the program. It runs smoothly without any hitches.

However it is not up to Chalksoft's normal high standards. Unless you are really addicted to computer learning, a good phrase book might do just as well.

Rog Frost

Atmospheric adventure

Greedy Dwarf
Goldstar Software

and great attention paid to creating atmosphere.

This starts with the booklet which comes with the program. It not only gives adventuring hints but also contains a proclamation from the King and details of your quest, the dwarf Arfa and the castle.

The graphics in the booklet are excellent and this is a better place for them than in the game itself. The quality continues with the location descriptions which are varied

and interesting.

The program knows around 230 words and these are not just verbs and nouns. There are also adverbs and adjectives. Commands such as "CRAWL EAST QUIETLY" are understood.

I have to confess I haven't found Arfa or any jewels, but it's a program I can't resist and I keep having another try.

I'm certainly pleased that the load and save position facilities work smoothly and easily.

This is a program for the more experienced adventurer and it scores highly in my top 10 adventures.

Rog Frost

FANCY a spot of decorating? Then Paint Roller is just the game for you. Splash it on all over and never mind the mess! The object of the game is to steer a speeding roller round the screen, painting it a nice deep blue. Sounds easy doesn't it? Don't be fooled - it requires skill and concentration.

The screen is littered with paintpots and rocks. Run over the paintpots but be careful not to hit the rocks - the result is disastrous.

Re-painting an area that's already been done is a waste of precious paint, so plan your route ahead carefully.

If you're having difficulty and the game is too fast, insert a delay loop of the form:
FOR delay=1 TO 50: NEXT
after the REPEAT in line 80.

SPLASH IT ALL OVER

```
10REM PAINT ROLLER!
20REM By C.Dunkley
30REM (c)ELECTRON USER
40MODE1:PROCinit:HX=0556
```

80

```
50REPEATPROCreset:REPEAT
PROCscreen:PROCplay:IFD PRO
Cdead ELSEPROCbonus
```

```
60UNTILX=0:PROCover:UNT
ILAS="N":MODE6:END
```

```
70DEFPROCplay
80REPEAT:CALLKX:CX=SX(AX
,BX):IFCX=40RPX<=0D=TRUE:60
TO110
```

```
90SOUND&1,1,CX*3,1:PX=PX
+(CX=1)-20*(CX=2):TX=TX+(CX
=0):SX(XY,YX)=1:SX(AX,BX)=3
:CALLEX:IFCX=0ORCX=2SX=1
0*(CX=0)-20*(CX=2):PRINTRI
GHT$("000000"+STR$SX,6):IFSX
>=WXLX=LX-(LX<6):SOUND1,2,1
00,5:PRINTTAB(30,1):LX=W
X+10000
```

```
100PRINTTAB(35,30)RIGHT$("
0000"+STR$PX,3)
```

```
110UNTILPX<=0ORTX=0ORD:IF
PX<=0CALLfor:PRINTTAB(35,30
)"000"
```

```
120IFTX<>0D=TRUE
```

```
130ENDPROC
```

```
140DEFFNF(IX,PX)=RIGHT$("
000000"+STR$IX,PX)
```

```
150DEFFNB:IFSX>=WXLX=LX-(
LX<6):SOUND1,2,100,5:PRINTT
AB(30,1):LX=W
X+10000
```

```
160=""
```

```
170DEFPROCfind
```

```
180REPEATXZ=RND(19):YX=RN
D(13):UNTILSX(XY,YX)=0:MOVE
XX*64-32,(15-YX)*64+30:ENDP
ROC
```

```
190DEFPROCinit:AX=0:BX=0
210ENVELOPE1,1,1,-2,1,7,5
,12,126,0,0,-126,126,126:EN
VELOPE2,1,2,-4,6,-1,3,4,126
,0,0,-126,126,126:DIMSX(19
,13),MAN(4),OX390:#fx11
```

```
220V=&FFEE:FORN=0TO1:PX=&
900:[OPT0:.dnor:LDA#0:JMPst
art:.dinv:LDA#&FF:.start:ST
A#09:LDA#31:JSRV:TXA:JSRV:T
YA:JSRV:LDA#0:PHA
```

```
230.loop0:PLA:TAX:LDAdata
,X:CMP#13:BEQend:STA#00:INX
:CPX#21:BEQend:TXA:PHA:LDX#
&80:LDY#0:LDA#10:JSR&FFF1:L
DA#23:JSRV:LDA#255:JSRV:LDY
#1
```

```
240.loop3:LDA#00,Y:EOR&09
:JSRV:JSRV:INY:CPY#5:BNEloo
p3:LDA#255:JSRV:LDA#10:JSRV
:LDA#0:JSRV:LDA#23:JSRV:LDA
#255:JSRV
```

```
250.loop4:LDA#00,Y:EOR&09
:JSRV:JSRV:INY:CPY#9:BNEloo
p4:LDA#255:JSRV:LDA#11:JSRV
:JMPloop0:.end:RTS:.data:EQ
US"
```

```
260.KX:LDA#&81:LDY#&FF:LD
X#190:JSR&FFF4:TXA:BEQnotup
:LDA#1:STA#70:.notup:LDA#&8
1:LDY#&FF:LDX#150:JSR&FFF4:
TXA:BEQnotdown:LDA#3:STA#70
:.notdown:LDA#&81:LDY#&FF:L
```

```
DX#152:JSR&FFF4:TXA:BEQnotr
ight:LDA#2:STA#70
```

```
270.notright:LDA#&81:LDY#
&FF:LDX#153:JSR&FFF4:TXA:BE
Qnotleft:LDA#4:STA#70:.notl
eft:DEC&440:LDA#460:STA#404
:LDA#464:STA#408:LDA#70:CMP
#1:BNEup:DEC&408:JMPcheck
280.nup:CMP#3:BNEup:INC&
408:JMPcheck:.ndw:CMP#4:BNE
nlf:DEC&404:JMPcheck:.nlf:C
MP#2:BNEcheck:INC&404:.chec
k:LDA#404:CMP#0:BNExta:LD
A#19:STA#404:RTS:.nexta:CMP
#20:BNExtb:LDA#1:STA#404:
RTS
```

```
290.nextb:LDA#408:CMP#0:B
NExtc:LDA#13:STA#408:RTS:
.nextc:CMP#14:BNEhome:LDA#1
:STA#408:.home:RTS:]NEXT
```

```
300PX=0X:FORN=1TO4:[OPT0:
.MAN(M):]:FORN=1TO11:READA:
[OPT0:LDA#A:JSRV:]NEXT:[OP
T0:RTS:]NEXT
```

```
310QX=PX:FORN=0TO1:PX=0X:
[OPT0:.EX:LDA#17:JSRV:LDA#1
31:JSRV:LDA#31:JSRV:LDA#460
:ASLA:TAX:DEX:TXA:JSRV:LDA#
464:ASLA:TAX:INX:TXA:JSRV:L
DA#32:JSRV:JSRV:LDA#0:JSRV:
JSRV:LDA#10:JSRV:LDA#32:JSR
V:JSRV:LDA#31:JSRV:LDA#404:
ASLA:TAX:DEX:TXA:JSRV
```

```
320LDA#408:ASLA:TAX:INX:T
XA:JSRV:LDA#404:STA#460:LDA
&408:STA#464:LDA#70:CMP#1:B
NEab0:JSRMAN(1):JMPfor:.ab0
```

```
:CMP#2:BNEab1:JSRMAN(2):JMP
for:.ab1:CMP#3:BNEab3:JSRMA
N(3):JMPfor:.ab3:JSRMAN(4)
```

```
330.for:LDA#17:JSRV:LDA#1
29:JSRV:LDA#31:JSRV:LDA#7:J
SRV:LDA#1:JSRV:RTS:]NEXT
```

```
340VDU23,224,0;1,2,4,8,17
,34,23,225,68,34,68,34,68,3
4,68,34,23,226,34,17,8,4,2,
1,0;23,227,0,170,85,0;170,8
5,0,23,228,0;128,64,32,16,1
36,68,23,229,68,136,16,32,6
4,128,0;23,1,0;0;0;23,230
,0,15,25,28,15,0,1,1
```

```
350VDU23,231,0,240,248,25
4,242,2,254,128,23,232,1,1,
1,1,3,3,3,0,23,233,128,128,
128,128,192,192,192,0,23,23
4,0;0;0;112,127,23,235,0,0;
12,30,26,18,214,23,236,127,
112,0;0;0;23,237,222,94,94,
94,76,72,120,0,23,238,0,3,3
,3,1,1,1,1
```

```
360VDU23,239,0,192,192,19
2,128,128,128,128,23,240,1,
127,64,79,127,31,15,0,23,24
1,128,128,0,240,56,152,240,
0,23,242,0,30,18,50,122,122
,122,123,23,243,0;0;0;14,25
4,23,244,107,72,88,120,48,0
,0;23,245,254,14,0;0;0;23,2
46,7,8,16,32,67,31,7,0
```

```
370VDU23,247,224,16,8,4,1
94,248,224,0,23,248,0,0;3,2
8,96,64,120,23,249,0,0;192,
56,6,2,30,23,250,127,115,10
9,125,123,112,63,7
```


PROCEDURES

play	Runs frame.
find	Finds an empty screen location.
init	Assembles machine code and defines graphics characters.
screen	Sets up screen.
dead	Loses a life.
over	Game over.
bonus	Obtains a bonus for completing a screen.
reset	Resets variables and prints instructions.

MAIN VARIABLES

H%	High score.
S%	Current score.
F%	Frame counter.
L%	Number of lives left.
X%	X coordinate of roller.
Y%	Y coordinate of roller.
AM	Area to be painted.

Get stuck in and paint the town blue in this game of fun from CARL DUNKLEY



```
380VDU23,251,254,206,182,
182,182,206,252,224,23,252,
0,3,5,10,61,42,53,26,23,253
,0,128,128,192,96,160,80,18
4,23,254,21,26,53,106,85,12
6,7,0
```

```
390DATA17,131,17,2,230,23
1,8,8,10,232,233,17,131,17,
2,234,235,8,8,10,236,237,17
,131,17,2,238,239,8,8,10,24
0,241,17,131,17,2,242,243,8
,8,10,244,245
```

```
400ENDPROC
```

```
410DEFPROCscreen
```

```
420VDU23,255,94,170,86,17
2,84,188,240,0:FORNX=1T03:V
DU19,NX,0;0;:NEXT:PX=80-FX:
IFPX<0PX=0
```

```
430FORYZ=1T013:FORXZ=1T01
9:SZ(XZ,YZ)=0:NEXT,?&FE27=
255:AM=4+FXDIV4:IFAM>7AM=7
440EX=0:COLOUR128:CLS:COL
OUR131:PRINTTAB(0,30)SPC(80
)TAB(0,0)SPC(80);:COLOUR129
:COLOUR2
```

```
450PRINTTAB(29,30)"PAINT:
"FNF(PX,3)TAB(29,31)"AREA :
"AM;"/8"TAB(1,1)"SCORE:"FNF
(SZ,6)TAB(31,1)"CREDIT:";LX
TAB(1,30)"FRAME:"FNF(FX,2)
```

```
460COLOUR131:M$="P A I N
T":N$="HI:"&FNF(HX,6):O$="R
O L L E R !":VDU5:6COL0,2:
MOVE472,62:PRINTM$:MOVE544,
996:PRINTN$:MOVE408,31:PRIN
TO$:6COL0,0:MOVE470,60:PRIN
TM$:MOVE542,995:PRINTN$:MOV
```

```
E406,29:PRINT0$
```

```
470VDU4:SZ(10,8)=3:PRINT
AB(0,2)CHR$224STRING$(38,CH
R$227)CHR$228TAB(19,17);:CA
LLMAN(2)
```

```
480FORNX=3T028:PRINTTAB(0
,NX)CHR$225TAB(39,NX)CHR$22
5:NEXT:TX=223:PRINTTAB(0,29
)CHR$226STRING$(38,CHR$227)
CHR$229
```

```
490FORNX=1T023:PROCfind:S
Z(XZ,YZ)=2:6COL0,2:VDU5,246
,247,8,8:6COL0,1:VDU240,249
,8,8,10,250,251,4:NEXT
```

```
500FORNX=2T012STEP2:RX=RN
D(FXMOD3):TX=TX-RX
```

```
510FORMX=1TORX:REPEATXZ=R
ND(17)+1:UNTILSZ(XZ,NX)=0
```

```
520SZ(XZ,NX)=4:COLOUR128:
COLOUR3:PRINTTAB(XZ*2-1,NX*
2+1);:VDU252,253,8,8,10,254
,255:NEXT,
```

```
530D=FALSE:XZ=10:YZ=8:7&7
0=2:VDU20,19,3,4;0;:COLOUR2
540TX=TX+AM/8:RESTORE660:
FORNX=1T017:READA,B:SOUND1,
-1,A,B:SOUND1,0,0,1:NEXT:RE
PEATUNTILADVAL(-6)=0:#fx21
```

```
550DX=INSTR("A.Z,"&GET$):
IFDX<>0?&70=DX
```

```
560PRINTTAB(19,17);:CALLM
AN(?&70):ENDPROC
```

```
570DEFPROCdead
```

```
580A$="D8D6D2D8P6L2L4D4D6
02D8":COLOUR128:COLOUR2:$da
ta="YOUR DEAD!":XZ=16:YZ=9:
LX=LX-1:CALLdnor:COLOUR129:
```

```
PRINTTAB(38,1);LX
```

```
590FORNX=1T022STEP2:SOUND
1,1,ASCMID$(A$,NX,1),VALMID
$(A$,NX+1,1):SOUND1,0,0,1:N
EXT:ENDPROC
```

```
600DEFPROCover
```

```
610COLOUR128:COLOUR2:IFSX
>HZYZ=14:XZ=15:$data="NEW H
I-SCORE":HX=SZ:CALLdnor
```

```
620YZ=20:XZ=12:$data="Ano
ther game (Y/N)?":COLOUR130
:COLOUR1:CALLdnor:REPEAT$=
GET$:UNTILAS$="Y"ORAS$="N":EN
DPROC
```

```
630DEFPROCbonus
```

```
640SOUND1,2,255,22:COLOUR
2:FORYZ=1T013:FORXZ=1T019:C
OLOUR128:IFSX(XZ,YZ)=2PRINT
TAB(XZ*2-1,YZ*2+1)" ";:VDU
8,8,10:PRINT;" ";:SOUND0,1
,2,2:SZ=SZ+30*FX:CALLfor:PR
INTFNF(SZ,6)FNB:MOVEXZ*64-3
2,(15-YZ)*64+30:6COL0,2:VDU
5,246,247,8,8:6COL0,1:VDU24
8,249,8,8,10,250,251,4
```

```
650 NEXT,COLOUR130:COLOU
R1:FX=FX+1:XZ=15:YZ=10:$dat
a="NEXT PATTERN":CALLdnor:C
OLOUR2:SZ=SZ+PX:SOUND0,1,2,
1:CALLfor:PRINTFNF(SZ,6)TAB
(35,30)"000"FNB:FORNX=1T025
5STEP4:SOUND&1,2,NX,1:NEXT:
ENDPROC
```

```
660DATA136,2,128,2,136,12
,128,2,120,2,116,2,108,2,10
4,8,108,16,0,2,136,2,128,2,
136,12,116,6,120,6,104,6,10
```

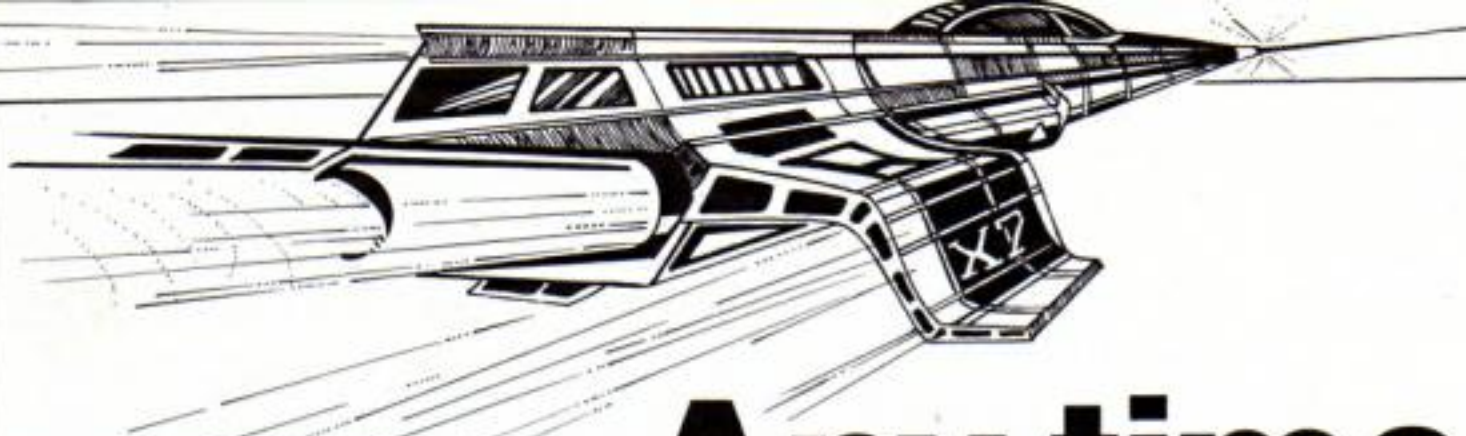
```
8,8
```

```
670DEFPROCreset:VDU20
680COLOUR128:CLS:COLOUR1:
SZ=0:LX=3:FX=1:WZ=10000:$da
ta="Press any key":XZ=13:YZ
=29:CALLdnor:$data="PAINT
ROLLER!":XZ=11:YZ=1:CALLdnor
:COLOUR3:PRINT"TAB(12)"By
C.Dunkley""The object of
this game is to paint the
screen."
```

```
690PRINT" If you leave on
e edge of the screen you wi
ll reappear at the other."
"While moving across a pre
viously filled area you wil
l lose paint at a faster
rate than normal!"
"A bon
us man is awarded every 100
00pts."
```

```
700PRINT" If you run out
of paint or hit one of th
e rocks you will lose a lif
e."
"SCORING:"
"Each squar
e covered .... 10pt"
" paint can collected...
. 20pt+201"
" unused .... 30*frame"
710COLOUR2:PRINT"CONTROL
S:"TAB(17)"A"TAB(16)"< >"
TAB(17)"Z":A$=GET$:ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.



Any time, any size, any where...

SO far in this short series looking at Mode 5 graphics we have been using a very simple print routine. This is capable of printing normal size, 8 by 8 pixels, multi-coloured characters.

If you typed in the sprite designer from the last article you'll now be ready for the full sprite print routine.

This final routine, although rather complex, is capable of printing a multicoloured character of any size at any screen address.

The EOR method is used to enable the character to pass over other characters or background objects without erasing them.

The routine is fast, powerful and enables characters to be animated. A character can be placed on the screen or moved from one position to another.

When the routine, which I've labelled *print*, is called, several items of data and parameters need to be passed to the program.

The address at which it is to be printed, the address of the data for the character and its size has to be passed to the second half of the routine labelled *put*. This is how to

remove a sprite as well — remember it's EOR logic.

Lines 250 to 280 of Sprite Print puts a large rocket on the screen.

The print address is placed in *new* and *new+1*, low byte/high byte and the data address in *newdata+1* and *newdata+2*.

The address is also stored at *address* and *address+1* as it's needed later.

The size is placed in *rows* and *columns* and *put* is called to print it.

If a character is to be moved the old print address and new address and the old and new data addresses are set before calling *print*.

The data for the character

at the old position can be different to the data for the character at the new position, but the size must be the same.

This enables characters to be animated as you quickly swap between two shapes.

The data pointers *olddata* and *newdata* and the old and new addresses of the character, *old* and *new* must be set before *print* is called.

The size of the sprite in columns and rows is passed in the X and Y registers.

An important point to notice is that the labels *olddata* and *newdata* actually point to the wrong byte.

Line 480 has the label *olddata* followed by LDA &3000. The &3000 should be

olddata, but *olddata* actually points to the first byte of the LDA opcode, so 1 is added to get the low byte of *olddata* and 2 to get the high byte.

The *moveit* loop between 300 and 360 show how to set up the parameters and call *print* to move a character.

It's not essential to understand how *print* works, but you do need to know how to use it, so study it carefully.

I'll briefly explain how *print* works. The first few instructions save the size of the character followed by the machine code equivalent of *FX19.

The *FX19 reduces flicker and adds a short delay, otherwise the routine would

Sprite Print Listing

```
10REM Sprite Print
20REM By R.A.Waddilove
30MODE 5
40PROCassemble
50REM read data
60FOR IX=0 TO 95
70READ JX:IX?&C00=JX
80NEXT
90REM print sprite
100PRINT "Press a key..."
:*FX21
110CALL sprite
120END
130
140DEF PROCassemble
150old=&70:new=&72:count=
&75:rows=&76:columns=&77
160counter=&7A:address=&7
B:tempcol=&7B
```

```
:osbyte=!&20A AND &FFFF
180temp1=&7D
190FOR pass=0 TO 2 STEP 2
200PX=&900
210[ OPT pass
220\set old address
230.sprite
240LDA #0:STA counter
250LDA #&00:STA new:STA a
ddress:LDA #&71:STA new+1:S
TA address+1 \set address
260LDA #&00:STA newdata+1
:LDA #&C:STA newdata+2 \se
t new data
270LDX #4:STX columns:LDY
#24:STY rows \set columns
+rows
280LDY #0:JSR put \-on s
creen
290JSR osrdch \wait for k
```

```
ey press
300.moveit
310LDA address:STA old:CL
C:ADC #0:STA new:STA addres
s
320LDA address+1:STA old+
1:ADC #0:STA new+1:STA add
ress+1
330LDA #&00:STA olddata+1
:STA newdata+1:LDA #&C:STA
olddata+2:STA newdata+2 \s
et new data
340LDX #4:LDY #24 \pass
columns+rows
350JSR print \-it
360DEC counter:BNE moveit
370RTS
380
390.print \uses new/old/
X=columns/Y=rows/olddata/ne
```

```
wdata
400STX columns:STY rows
410STX tempcol \save col
ums
420LDA #19:JSR osbyte \*
FX19
430LDY #0
440.loop1
450LDA old:STA temp1:LDA
old+1:STA temp1+1 \save ad
dress of column
460LDX rows
470.loop2
480.olddata LDA &3000:EOR
(old),Y:STA (old),Y
490INC olddata+1:BNE p1:I
NC olddata+2
500.p1 LDA old:AND #7:CMF
#7:BEQ bottom
510INC old:BNE p2:INC old
```


Part 4 of ROLAND WADDILOVE's series on programming graphics with arcade games in mind

be too fast.

It isn't usually placed in the print routine itself but in this program it's the best place for it.

Try putting it somewhere else if you don't believe me!

The character is printed by running from left to right across the screen printing each vertical column.

The routine starts in the top left corner and prints down to the bottom of the first column. It then moves to the top of the next column, prints that column, and so on.

Figure 1 shows the top left portion of the screen memory.

If you look at it you'll see that starting at the top left corner and reading down the address increments by one each time for eight bytes.

Then there is a jump of &139 to the next address, which is on the next character row.

If the print routine is to cope with a character which is split over two or more lines when it is printing a column, it must detect when to add one to the address and when to add the larger increment, &139.

Line 460 of *print* loads the number of rows into the X

register and *loop2* prints the column.

Line 480 collects each item of data and EORs it with the screen memory.

Line 500 checks the address to see if &139 or 1 should be added to the current address to get the next one.

It's actually not that difficult, as the three least significant bits of the address are always equal to seven when a jump of &139 is required, which is quite convenient.

The low byte of the address is ANDed with 7 and compared with 7 in line 500. If it is equal to 7, &139 is added by branching to *bottom*. If it isn't equal only 1 is added.

When all the rows have been printed *old* is restored so that it again points to the top of the column.

The next column is printed by pointing *old* to the top of the next column by adding 8 to it.

This process is repeated and the number of columns is decremented each time until zero.

There are many different ways to print multicoloured characters, the method listed

&5800	&5808	&5810	&5818
&5801	&5809	&5811	&5819
&5802	&580A	&5812	&581A
&5803	&580B	&5813	&581B
&5804	&580C	&5814	&581C
&5805	&580D	&5815	&581D
&5806	&580E	&5816	&581E
&5807	&580F	&5817	&581F
&5940	&5948	&5950	&5858
&5941	&5949	&5951	&5959
&5942	&594A	&5952	&595A

Figure 1

here is just one. The technique is identical for all modes and all that needs changing is the &139 increment.

Try designing a few characters of your own and replace the data at the end of the

program with your own. The program looks complicated but it should hopefully be fairly easy to use.

● That's all for this month. Next time we'll look at collision detection.

```
+1:.p2 BNE next1
520.bottom \row
530CLC:LDA old:ADC #&139:S
TA old:LDA old+1:ADC #1:STA
old+1
540.next1
550DEX:BNE loop2 \next r
ow
560LDA temp1:ADC #8:STA o
ld:LDA temp1+1:ADC #8:STA o
ld+1
570DEC columns:BNE loop1
\next column
580LDA tempcol:STA column
s \restore columns
590.put \put sprite on s
creen
600.loop1
610LDA new+1:STA temp1+1:
```

```
LDA new:STA temp1 \save ad
dress of column
620LDX rows
630.loop2
640.newdata LDA &3000,Y:E
OR (new),Y:STA (new),Y
650INC newdata+1:BNE p3:I
NC newdata+2
660.p3 LDA new:AND #7:CMF
#7:BEQ bottom2
670INC new:BNE p4:INC new
+1:.p4 BNE next2
680.bottom2 \row
690CLC:LDA new:ADC #&139:S
TA new:LDA new+1:ADC #1:STA
new+1
700.next2
710DEX:BNE loop2 \next r
ow
```

```
720LDA temp1:ADC #8:STA n
ew:LDA temp1+1:ADC #8:STA n
ew+1
730DEC columns:BNE loop1
\next column
740RTS
750J
760NEXT
770ENDPROC
780
790REM Missile
800REM rows=24/columns=4
810DATA 204,226,241,240,2
40,240,240
820DATA 15,15,0,255,240,2
40,255,0,15
830DATA 15,240,240,240,24
0,241,226
840DATA 204,0,0,0,136,196
```

```
,226,241,15
850DATA 15,0,255,240,240,
255,0,15,15
860DATA 241,226,196,136,0
,0,0,0,0
870DATA 0,0,0,0,15,15,0,2
55,240,240
880DATA 255,0,15,15,0,0,0
,0,0,0,0
890DATA 0,0,0,0,0,0,0,12,
6,207,225
900DATA 225,207,6,12,0,0,
0,0,0,0
910DATA 0
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

These ***** strings can prove to be ***** useful

THIS month sees us continuing our exploration of string handling with Electron Basic. We'll be looking at an easy way of creating strings and using it to show how to avoid one of the programming problems you can enter if you're unwary.

And not satisfied with creating strings, we'll start to chop them up, taking the bits we want and discarding the rest.

But first, string creation. Suppose you wanted to create a string of five asterisks, possibly to help enliven a screen display or just because you're that type of person. One way of doing it would be:

```
LET asterisk$= "*****"
```

But what if you wanted 10 or 20? You'd be typing an awful lot of asterisks just to make one *asterisk\$*. Happily, there is a Basic function that makes the job easier. It's the *STRING\$* function.

Using this, if we wanted a string made up of five *asterisk\$* we'd enter:

```
asterisk$=STRING$(5,"*")
```

when:

```
PRINT asterisk$
```

will show you that *asterisk\$* does contain five of the brutes. Similarly:

```
asterisk$=STRING$(10,"*")
```

By PETE BIBBY

will produce a string of 10 asterisks, storing them in the string variable *asterisk\$*, while:

```
asterisk$=STRING$(20,"*")
```

will put 20 asterisks in *asterisk\$*.

As you can see, the first item inside the brackets following *STRING\$* tells the Electron how many repetitions there are to be.

The second item, the one after the separating comma, tells the micro which string is to be repeated to make up the larger string.

So, *STRING\$* can save you a lot of typing. It can also save you a lot of heartache. Have a look at the following:

```
PRINT "ABC  
XYZ"
```

This is supposed to be ABC followed by 20 spaces, then XYZ. The trouble is, when it's split over a column it's anybody's guess how many spaces there are. A much better way of doing the same thing is:

```
PRINT "ABC"+STRING$(20," ")  
+"XYZ"
```

which gives the desired result and is much easier to type in.

If you really want to be pedantic, you could even object to the space in between the inverted commas. Why not replace it with:

```
PRINT "ABC"+STRING$(20,  
CHR$(32))+"XYZ"
```

and make it even easier?

So *STRING\$* makes life easier for budding typists. To test your understanding of strings, *STRING\$* and *LEN*, cast your eye over the following lines:

```
asterisk$="*"  
asterisk$=asterisk$+asterisk$  
asterisk$=STRING$(3,asterisk$)  
asterisk$=STRING$(LEN(asterisk$),asterisk$)
```

Can you figure out the final number of asterisks held in *asterisk\$*? If you can, well done. If you can't, you'll find the answer by entering them into your Electron and using:

```
PRINT LEN(asterisk$)
```

Now let's move onto that programming problem mentioned earlier. Program 1 shows what I mean. And it

uses asterisks!

As you'll find when you run it, after a few seconds of flickering cursor the program grinds to a halt with a:

No room

error message. To see what's gone wrong, let's take a look at the listing.

Line 20 is fairly straightforward, it just sets up a one dimensional array *string\$()* which contains 11 elements.

```
10 REM PROGRAM 1  
20 DIM string$(10)  
30 FOR outerloop=1 TO 25  
5 40 FOR eachstring=1 TO 1  
0 50 string$(eachstring)=string$(eachstring)+"*"  
60 NEXT eachstring  
70 NEXT outerloop
```

Program 1

If you're wondering why that's 11, not 10, remember that there is an element *string\$(0)*.

Lines 30 and 70 form a FOR ... NEXT loop and inside it is nested another FOR ... NEXT loop.

The outer loop is to cycle 255 times, the inner one 10 times for each repetition of the outer loop.

Let's look at what's hap-

pening in line 50, the one that does the real work.

This takes each of the 10 *string\$()* in turn and adds an asterisk to it. So the inner loop increases the length of each *string\$* in turn by one.

The outer loop cycles 255 times and for each cycle of the outer loop the inner one goes round 10 times, adding an asterisk to each *string\$()*.

So in all 255 asterisks are eventually stored in each of the 10 *string\$()* used by the program.

Or they would be if the program didn't crash.

The reason things go wrong is because of a peculiarity of Electron Basic.

You'll remember from the first articles that when we talk of a variable such as *fred\$*, what we are doing is labelling the area of memory that's used to store the contents of *fred\$*.

When we use *fred\$* in a program the micro goes to the bit of memory labelled as *fred\$* and uses whatever it finds there in place of *fred\$* in the program.

Now it should be fairly obvious that a *fred\$* created by:

```
fred$="*****"
```

will take up a lot more memory than one created by:

```
fred$="**"
```

In the first there are 10 asterisk\$, in the second only two. It's clear that the shorter string will take up less memory space. Just as it's clear that:

```
fred$="*****  
*****"
```

will use a lot more.

So long strings – and they can be up to 255 characters in length – take up lots of memory. However, when a string is growing in length things get worse.

Let's take *fred\$* again. Suppose in a program it starts off as:

```
fred$="*"
```

just a solitary asterisk which, viewed simply, takes up one memory space. Now if we add another asterisk to *fred\$* with

a line such as:

```
fred$=fred$+fred$
```

then *fred\$* will contain two asterisk\$.

So, you might ask, what's the problem? Just add another asterisk to the old *fred\$*. It's not that easy.

You see, after we used *fred\$* we might have used another variable such as *number*.

The value for this would be stored just after our old *fred\$*, leaving no room for it to be expanded by one asterisk.

It's hemmed in on both sides by other variables, leaving it no room to grow.

One answer to this might be to shuffle all the bits of memory up or down one place to make room for our extra asterisk.

However, this takes a lot of time and effort and the Electron uses another, much faster method.

Put simply, it abandons the old *fred\$* and stores the new, two-asterisk version in a different place in memory.

Now suppose we carried on with:

```
fred$=fred$+"*"
```

Once again the old *fred\$* is cast aside and a new, three-asterisk version created. This can carry on and on up until *fred\$* reaches its maximum length of 255 characters.

As you can imagine, the micro's memory becomes filled with redundant *fred\$* that are no use to anybody but still take up memory.

But, like all things, memory is limited and if there are a lot of other variables as well as *fred\$* you can see that eventually there isn't going to be room to store any more.

And this is what has happened in Program I.

Each time round the outer loop, a new, longer version of *string\$()* is created, taking up more memory while old versions are still lurking around, using it up as well.

If the program had succeeded in its mad desire to have 10 *string\$()*, each consisting of 255 characters, there

would have been 254 old versions of each littered around memory. However, long before this the micro gives up with a:

No room

message. You can't blame the poor thing!

The trouble is that at times you are using a lot of strings and you do want them to keep growing, even to the limit.

Is there any way round this memory trap? Program II shows a solution to the dilemma.

```
10 REM PROGRAM II  
20 DIM string$(10)  
30 FOR setlength=1 TO 10  
40 string$(setlength)=ST  
   RING$(255,CHR$(32))  
50 string$(setlength)=""  
60 NEXT setlength  
70 FOR outerloop=1 TO 25  
5  80 FOR eachstring=1 TO 1  
0    90 string$(eachstring)=s  
      tring$(eachstring)+"*"  
100 NEXT eachstring  
110 NEXT outerloop  
120 FOR display=1 TO 10  
130 PRINT string$(display  
)  
140 NEXT display
```

Program II

Here you'll see that lines 70 to 110 are trying to do the same job as Program I, but this time the program works successfully.

There is no "No room" message and we are rewarded with 2,550 asterisks. What's happened?

The secret lies in the FOR ... NEXT loop formed by lines 30 to 60. As you can see with your newfound knowledge of *STRING\$*, line 40 sets the variable *string\$()* to its maximum length of 255 characters, filling it with spaces.

Having done this, the next line sets the same *string\$()* to the null string, effectively

emptying it. This seems a bit daft, filling each of the 10 string variables in turn and then emptying them.

However, it does make sense and, again, it's all to do with the way Basic stores strings.

Suppose we had a variable created by:

```
fred$="***"
```

Now *fred\$* contains three asterisks. Suppose that a command like:

```
fred$="***"
```

set *fred\$* back to two asterisk\$.

The second string is shorter than the first, so it will fit comfortably inside the memory space already allocated to the previous length of *fred\$*. There's no need to create another string elsewhere in memory.

From this you can see that if we already know the maximum length a string is going to take we can initially set it to that length.

The micro reserves the necessary memory space for that length of string.

Since in the program the string will never exceed that length, it can vary in length between zero and the maximum and still use the same, original bit of memory.

There's no need for a scattering of redundant strings to occur.

This is what line 40 does. As the loop cycles it sets each *string\$()* in turn to its absolute maximum length, filling it with spaces. However, we don't want spaces in *string\$()*, so the next line just sets each to the null or empty string so we can do what we want with it later.

The point is that now there is enough memory set aside for each of the *string\$()* to hold anything from no asterisks to 255 of them.

There's no need to create redundant strings of different lengths all over memory, they can all fit in the original



From Page 21

allocations.

Before we leave Program II can I point out that the FOR...NEXT loop of lines 30 to 60 is very inefficient.

Really there's no need to use STRING\$ 10 times, it need only be used once and the various string\$() set to the maximum length.

I leave that to you to code.

And now an abrupt change of subject as we deal with the Basic function LEFT\$.

All this does is to pick out the lefthand characters of a string. How many characters are selected depends on the figures in the brackets following LEFT\$. Try entering:

```
PRINT LEFT$("lefthand",4)
```

and you'll see that LEFT\$ has taken the leftmost four characters from the string inside the brackets. Similarly:

```
test$="1234567"
five$=LEFT$(test$,5)
PRINT five$
```

takes five characters from test\$, starting from the left hand character, and stores them in five\$.

You should have no trouble

```
10 REM PROGRAM III
20 test$="12345"
30 FOR loop= 1 TO 5
40 PRINT LEFT$(test$,loop)
50 NEXT loop
```

Program III

in following Program III, which uses LEFT\$ to extract increasing numbers of characters from test\$.

As loop increases in value, so the LEFT\$ of line 40 takes more characters from test\$. When you look at the output:

```
1
12
123
1234
12345
```

doesn't it remind you of something? Doesn't it look like the triangle of asterisks we created when learning about FOR...NEXT loops?

Never one to miss an opportunity to create a triangle

```
10 REM PROGRAM IV
20 asterisk$="*****"
30 FOR row=1 TO LEN(asterisk$)
40 PRINT LEFT$(asterisk$,row)
50 NEXT row
```

Program IV

of asterisks, Program IV does the job producing:

```
*
**
***
****
*****
*****
*****
```

Can you produce the following triangle:

```
*****
*****
*****
****
***
**
*
```

by changing line 30 of Program IV? You'll have to use a STEP of minus 1.

However there's a lot more to LEFT\$ than just drawing triangles of asterisks. Program V shows how it can be used to read in and process data from DATA statements.

The program is fairly straightforward and should cause you no problems. It's just the usual READ command nested in a FOR...NEXT loop.

The point to notice is how the data is set up or configured.

If you look at each of the strings that are read into record\$() you'll see that they are exactly 12 characters in length.

The first 10 characters are

used to contain a name, the last two to hold an age.

If the name is shorter than 10 characters, as they all are, spaces are used to "pad out" the name field to its full length of 10. Figure 1 shows how it's done.

Character position	1	2	3	4	5	6	7	8	9	10	11	12
Data	P	e	t	e	r						3	4
	B	o	d	g	e	r					3	
	S	p	o	t							2	

Figure 1: Character positions of record\$()

```
10 REM PROGRAM V
20 DIM record$(3)
30 FOR loop=1 TO 3
40 READ record$(loop)
50 NEXT loop
60 FOR loop=1 TO 3
70 PRINT LEFT$(record$(loop),10)
80 NEXT loop
90 DATA Peter 34
100 DATA Bodger 3
110 DATA Spot 2
```

Program V

Knowing that the name field is always 10 characters in length allows the LEFT\$ of line 70 to extract the names from the data strings.

As you can see, this system of organising the data works, but it does have problems.

What if Peter was 111 years old or Spot was actually called "Spottythecat"? The system would fall down.

The program wouldn't crash, you'd just get some incorrect answers.

As you can see, the method works, but only if the data strings are in a strict layout or

```
10 REM PROGRAM VI
20 test$="vwxyz"
30 FOR loop= 1 TO 5
40 PRINT RIGHT$(test$,loop)
50 NEXT loop
```

Program VI

format. It's efficient, but rigid.

Having already dealt with LEFT\$, the more suspicious readers may be wondering if there is a Basic function RIGHT\$. They'd be right, as Program VI shows.

This uses RIGHT\$ in exactly the same way as Program III used LEFT\$, producing:

```
z
yz
xyz
wxyz
vwxyz
```

as output. As you can see, RIGHT\$ starts to take its characters from the rightmost end of the string and moves inwards from there.

Of course the exciting question is whether we can use RIGHT\$ to create triangles of asterisks that are the mirror image of the ones produced before.

We can, but it can't be done simply by substituting RIGHT\$ for LEFT\$ in Program IV. Try it and see why. Program VII is what is needed.

```
10 REM PROGRAM VII
20 asterisk$="*****"
30 length=LEN(asterisk$)

40 FOR row=1 TO length
50 PRINT STRING$(length-row,CHR$(32))+RIGHT$(asterisk$,row)
60 NEXT row
```

Program VII

Here, line 50 uses a combination of STRING\$ and RIGHT\$ to produce:

```
*
**
***
****
*****
*****
*****
```

STRING\$ is needed to provide the spaces used to position the asterisk correctly. Notice that CHR\$(32) is used to provide the spaces.

Another point to notice is that the length of asterisk\$ is

Beginners

stored in the numeric variable *length* before the program enters the loop.

It would have been possible to have lines 40 and 50 read:

```
40 FOR row=1 TO
LEN(asterisk$)
50 PRINT STRING$(LEN
(asterisk$)-row,CHR$(32))
+RIGHT$(asterisk$,row)
```

but that would mean that the value of:

LEN(asterisk\$)

would be calculated afresh each time round the loop. Since this value never changes, the same calculation would be done over and over to no avail.

It's much better to find the value before entering the loop and put it in *length* for once and for all.

Before we leave Program VII, try to modify it to produce another triangle of asterisks shaped like:

```
*****
*****
****
***
**
*

```

There's no need to be negative about it, provided that you take the right steps!

And that's where we leave asterisks for this time. Program VIII goes back to reading in data strings. This time it's using both RIGHTS and LEFTS

```
10 REM PROGRAM VIII
20 DIM record$(3)
30 FOR loop=1 TO 3
40 READ record$(loop)
50 NEXT loop
60 FOR loop=1 TO 3
70 PRINT RIGHT$(record$(
loop),2);CHR$(32);LEFT$(rec
ord$(loop),10)
80 NEXT loop
90 DATA Peter      34
100 DATA Bodger    3
110 DATA Spot      2
```

Program VIII

to rearrange the data.

Line 70 is where the work is done. Here RIGHTS is used to extract the last two characters from each *record\$()*.

Since the data strings are still in the 12 character form we met in Program V this means that RIGHTS extracts the ages from the data strings.

The rest of the line just adds a space and then uses LEFTS to extract the name fields. The result is that:

```
34 Peter
3 Bodger
2 Spot
```

is displayed on the screen.

The method used in Programs V and VIII works, but it's very limited. Suppose you were trying to store and process the age and weight of Tom the cat, Ian the rat and Eric the bat?

Figure II shows this information in tabular form.

NAME	SPECIES	AGE	WEIGHT
TOM	CAT	3	7
IAN	RAT	2	1
ERIC	BAT	1	1

Figure II: Animal data

Of course you could put each set of information into a string and read it into a variable such as *record\$()* with lines like:

```
100 DATA TOM CAT 3 7
110 DATA IAN RAT 2 1
120 DATA ERIC BAT 1 1
```

but there would be problems. Could you use only LEFTS and RIGHTS to extract just the species and weight or the name and age?

If you try it, you'll see that we could do with something that didn't just take characters from the right or left, but also from the middle.

And that's what we'll be dealing with next time, the Basic function MIDS.

Until then, keep on practising what we've covered this month. After all, you wouldn't want it said that you don't know your RIGHTS from your LEFTS when it comes to STRINGS.

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WE seem to be in a mechanical frame of mind nowadays.

The June issue had Dave Robinson's Engine, showing us the ins and outs of internal combustion.

Now we have Paul Heath's Train, a delightful little piece of animated action.

The age of the train...

PROGRAM EXPLANATION

50-100 Set up the screen background and draw the rail.
110-250 Make use of PROCcircle to draw the engine's wheels.
260-340 Use PROCspoke and PROCspoke2 to draw the spokes.
350-470 Draw the sleepers. Figure 1 shows how it's done.

480-660 Produce the train's body.
670-700 Smoke clouds.
710-970 Produce the animation techniques by changing the colours on the screen.
980-1200 Define the procedures.

Train Listing

```

10 REM***TRAIN***
20 REM***By Paul Heath**
30 REM (C) ELECTRON USER
1985
40 REM
50 MODE2
60 VDU23;8202;0;0;0;
70 VDU19,14,4;0;:6COL0,1
42:VDU24,0;405;1250;1023;:C
L6
80 VDU19,13,2;0;:6COL0,1
41:VDU24,0;0;1250;350;:CL6

90 VDU24,0;0;1250;1023;
100 GCOL0,0:MOVE310,530:D
RAW350,400:PLOT85,850,400:D
RAW900,530:PLOT85,310,530:D
RAW310,560:PLOT85,900,560:D
RAW900,530:PLOT85,310,530
110 REM **Draws wheels**
120 VDU19,9,6;0;:6COL0,9
130 PROCcircle(600,500,11
0)
140 PROCcircle(400,460,67
)
150 PROCcircle(800,460,67
)
160 MOVE 0,400:DRAW1250,4
00:PLOT85,0,300:DRAW1250,30
0:PLOT85,1250,400
170GCOL0,0
180MOVE0,400:DRAW1250,400
190PROCcircle(600,500,100
)
200PROCcircle(400,460,60)
210PROCcircle(800,460,60)
220GCOL0,9
230PROCcircle(600,503,95)
240PROCcircle(400,463,55)
250PROCcircle(800,463,55)
260 REM **Draws spokes**
270VDU19,6,6;0;:6COL0,6
280PROCspoke(600,500,95)
290PROCspoke(400,460,55)
300PROCspoke(800,460,55)
310VDU19,5,6;0;:6COL0,5
320PROCspoke2(600,500,95)
330PROCspoke2(400,460,55)
340PROCspoke2(800,460,55)
350 REM **Draws sleepers*
360VDU19,2,1;0;:VDU19,3,0
;0;:VDU19,4,0;0;
370FORn=0 TO 1250 STEP 10
0
380 z=n
390FORc=1TO4
400GCOL0,c
410FORx=z TO z+25 STEP 6
420MOVEx,300:DRAWx,360
430NEXTx
440z=z+25
450GCOL0,c
460NEXTc
470NEXTn
480 REM **Draws train bod
y**
490VDU19,10,1;0;:6COL0,10
500MOVE300,510:DRAW310,51
0:PLOT85,310,570:DRAW300,57
0:PLOT85,300,510:DRAW310,57
0:DRAW900,570:PLOT85,310,56
0:DRAW900,560:PLOT85,900,57
0:DRAW910,570:PLOT85,910,51
0:DRAW900,510:PLOT85,900,57
0
510GCOL0,0:MOVE300,574:DR
AW910,574
520MOVE320,600:DRAW430,60
0:PLOT85,430,800:DRAW320,80
0:PLOT85,320,600:DRAW350,60
0:DRAW350,575:PLOT85,370,57
5:DRAW370,600:PLOT85,350,60
0
530MOVE310,650:DRAW310,70
0:DRAW320,700:MOVE310,790:D
RAW310,760:DRAW320,760
540GCOL0,0:MOVE360,800:DR
AW360,860:PLOT85,400,800:DR
AW400,860:PLOT85,360,860:MO
VE350,850:DRAW410,850
550VDU19,10,1;0;:6COL0,10
:MOVE430,600:DRAW430,800:PL
OT85,750,800:DRAW750,600:PL
OT85,430,600:MOVE450,575:DR
AW750,575:PLOT85,750,600:DR
AW450,600:PLOT85,450,575
560MOVE750,850:DRAW750,57
5:PLOT85,700,575:DRAW700,85
0:PLOT85,750,850:MOVE780,75
0:DRAW780,575:PLOT85,820,57
5:DRAW820,750:PLOT85,780,75
0:MOVE780,850:DRAW780,830:P
LOT85,900,850:DRAW780,830:P
LOT85,900,830
570MOVE880,830:DRAW880,57
5:PLOT85,900,830:DRAW900,57
5:PLOT85,880,575:MOVE900,77
0:DRAW950,770:PLOT85,900,58
0:DRAW950,630:PLOT85,950,77
0
580GCOL0,0:MOVE450,575:DR
AW900,575:MOVE450,575:DRAW4
50,750:DRAW750,750:DRAW750,
575:DRAW750,850:DRAW900,850
:MOVE570,750:DRAW570,760:DR
AW630,760:DRAW630,750:MOVE3
00,570:DRAW300,510:MOVE910,
570:DRAW910,510
590GCOL0,10:MOVE520,800:D
RAW520,820:PLOT85,580,800:D
RAW580,820:PLOT85,520,820:D
RAW530,840:PLOT85,550,820
600MOVE530,840:PLOT85,550
,850:DRAW570,840:PLOT85,550
,820:DRAW570,840:DRAW580,82

```


	3	4	1	2	3	4	1	2	3	4	1	2	3	4
--	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Figure 1: The track layout

The numbers above are colour numbers. Each sleeper is made up of two of these squares.

So, for example:

```
VDU 19,1,1;0;
```

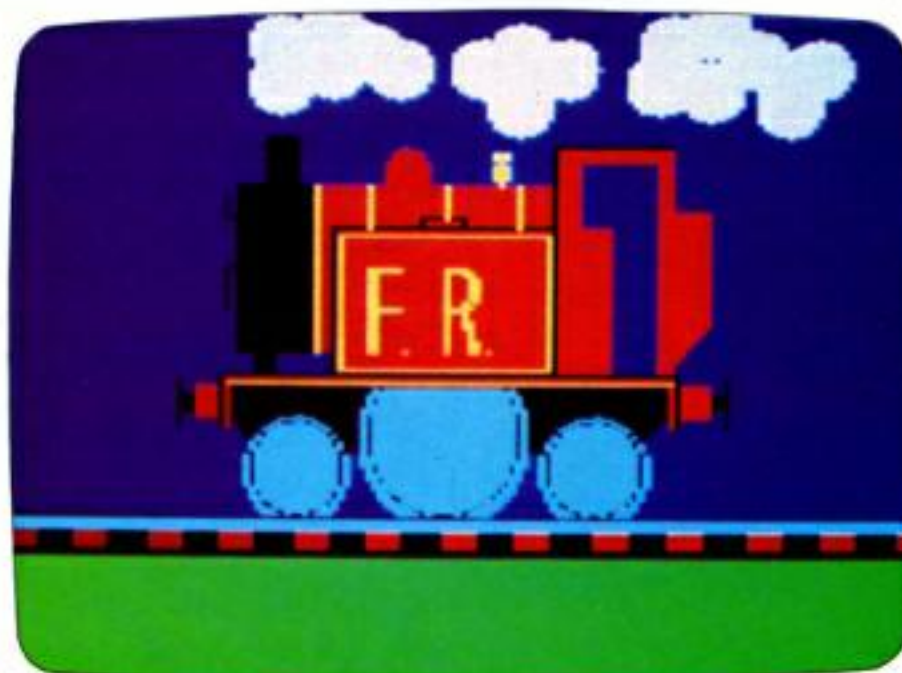
and

```
VDU 19,2,1;0;
```

will turn all the squares labelled 1 and 2 to red. Before this is drawn the colours are set to black so that they don't show.

To make the track appear to

move the following sequence is operated: 1 black, 3 red, 2 black, 4 red, 3 black, 1 red, 4 black, 2 red.



PROCEDURES

PROCcircle(X,Y,R) Draws a solid circle with centre coordinates X,Y with radius R.

PROCSPOKE Draw the spokes. Two procedures are used to offset the spokes so that when the colour changes take place the wheels appear to revolve.

PROCSPOKE2

PROCWAIT Waits and makes the noises.

```
0:PLOT85,550,820
610VDU19,11,3;0;:6COL0,11
:MOVE430,600:DRAW430,800:MO
VE500,800:DRAW500,750:MOVE6
00,800:DRAW600,760:MOVE700,
800:DRAW700,750:MOVE460,580
:DRAW460,740:DRAW740,740:DR
AW740,580:DRAW460,580:MOVE3
09,565:DRAW901,565
620MOVE673,800:DRAW673,84
0:DRAW677,840:DRAW677,800:D
RAW673,800:MOVE667,810:DRAW
667,825:MOVE667,835:DRAW667
,840:MOVE683,810:DRAW683,82
5:MOVE683,835:DRAW683,840:M
OVE500,600:DRAW500,700:DRAW
540,700:DRAW540,696:DRAW505
,696:DRAW505,655
630DRAW540,655:DRAW540,65
0:DRAW505,650:DRAW505,600:P
LOT69,550,600:MOVE600,600:D
RAW600,700:DRAW630,700:DRAW
640,690:DRAW640,660:DRAW630
,650:DRAW640,600:DRAW637,60
0:DRAW625,650:DRAW605,650:D
RAW605,600:MOVE605,655:DRAW
605,697:DRAW625,697
640:DRAW636,600:DRAW636,6
70:DRAW626,655:DRAW605,655:
PLOT69,660,600
6506COL0,10:MOVE295,520:D
RAW265,520:PLOT85,265,560:D
RAW295,560:PLOT85,295,520:M
```

```
OVE915,520:DRAW945,520:PLOT
85,945,560:DRAW915,560:PLOT
85,915,520:6COL0,0:MOVE260,
530:DRAW240,530:PLOT85,240,
550:DRAW260,550:PLOT85,260,
530:MOVE240,510:
660DRAW240,570:MOVE952,53
0:DRAW952,550:PLOT85,970,55
0:DRAW970,530:PLOT85,952,55
0:MOVE970,510:DRAW970,570
670 REM **Draws smoke**
680VDU19,7,7;0;:6COL0,7:P
ROCcircle(300,930,40):PROCC
ircle(300,980,40):PROCCircl
e(450,950,40):PROCCircle(45
0,1000,40):PROCCircle(500,9
70,40):PROCCircle(540,950,4
0)
690VDU19,8,7;0;:6COL0,8:P
ROCcircle(650,950,40):PROCC
ircle(700,980,40):PROCCircl
e(700,970,40):PROCCircle(76
0,950,40)
700VDU19,12,7;0;:6COL0,12
:PROCCircle(800,930,40):PRO
CCircle(900,980,40):PROCCir
cle(950,920,40):PROCCircle(
960,1000,40):PROCCircle(101
0,960,40):PROCCircle(1050,9
00,40):PROCCircle(1090,950,
40)
710 REM **Changes the col
ours to make
```

```
720 REM **the train appea
r to move**
730VDU19,7,4;0;:VDU19,8,7
;0;
740VDU19,5,0;0;
750VDU19,1,1;0;
760VDU19,12,4;0;
770VDU19,7,7;0;
780PROCWAIT
790VDU19,5,6;0;
800VDU19,3,1;0;
810VDU19,1,0;0;
820VDU19,6,0;0;
830VDU19,7,4;0;
840VDU19,8,7;0;
850VDU19,4,1;0;
860VDU19,2,0;0;
870VDU19,1,1;0;
880VDU19,3,0;0;
890PROCWAIT
900VDU19,8,4;0;
910VDU19,12,7;0;
920VDU19,2,1;0;
930VDU19,4,0;0;
940VDU19,6,6;0;
950VDU19,5,0;0;
960GOTO750
970END
980 REM **Circle drawing
procedure**
990 DEF PROCcircle(X,Y,R)
1000LOCAL I,J
1010 FOR I=Y+R TO Y-R STEP
```

```
-4
1020 J=SQR(ABS(R+R-(I-Y)*(
I-Y)))
1030MOVEX-J,I
1040DRAWX+J,I
1050 NEXT
1060 MOVE X,Y
1070 ENDPROC
1080 REM **Spoke drawing p
rocedures**
1090DEFPROCSPOKE(X,Y,R)
1100FOR angle=4TO10 STEP 0.
8
1110PLOT69,X+(R+(R/100))*S
IN(angle),Y+R*COS(angle)
1120DRAWX,Y
1130NEXT
1140ENDPROC
1150DEFPROCSPOKE2(X,Y,R):F
OR angle=6TO12STEP0.8
1160PLOT69,X+(R+(R/100))*S
IN(angle),Y+R*COS(angle)
1170DRAWX,Y:NEXT:ENDPROC
1180 REM **Waits and makes
the noise**
1190DEFPROCWAIT:SOUND0,1,1
50,1:SOUND0,-15,100,3
1200ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

THIS month we'll be looking at the Acorn Plus 1. First we'll see how to check the performance of joysticks and then how *FX calls are used with printers.

The first and most important call when using an Electron with Plus 1 attached is *FX163,128,1.

This is used to switch off the Plus 1 totally. Why should we wish to do that you may ask?

Well, all the time that it's switched on the Electron keeps checking to see if anything is happening with the Plus 1, such as someone using the joysticks.

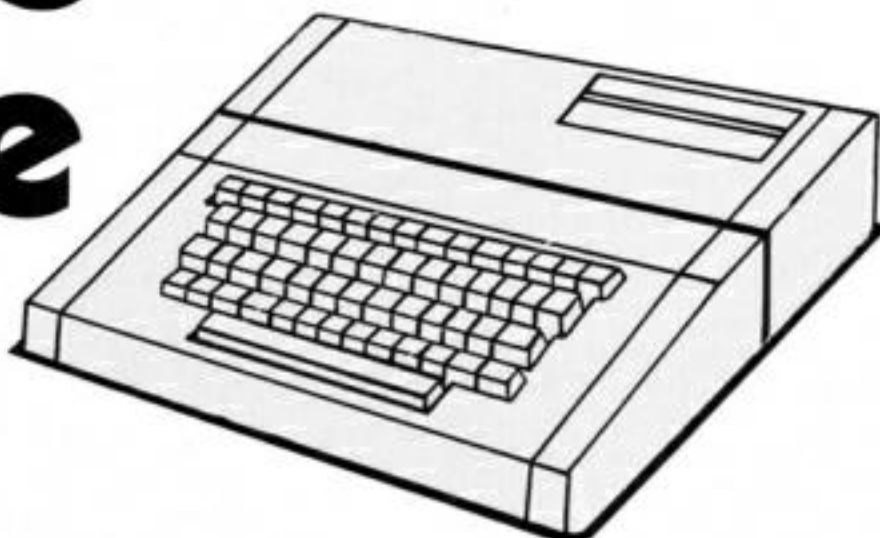
This slows down the Electron and can cause problems such as failure to read in programs correctly. My version of Gatecrasher just refuses to load with the Plus 1 in action.

Having been switched off, the Plus 1 is activated again using *FX163,128,0. Alternatively, the procedure in Program I can be used with PROCfx(163,128,0).

The osbyte call *FX3 has several functions, some are associated with the Plus 1. *FX3,0 is the default setting. This disables (switches off) the RS423 driver, the serial output that's used by some printers and devices like modems.

It also enables (switches

Calling on the Plus 1



on) VDUs and allows parallel printers to be enabled using VDU2.

There are more calls in the *FX3 repertoire. *FX3,1 is used to enable the RS423 while *FX3,2 cuts off the keyboard VDU driver and prevents any character being sent to the screen. Try it. If you now enter *FX3,0 the prompt will return.

*FX3,8 enables the printer independently of VDU2 and 3. Try entering *FX3,8 and then type in LIST and press Return. Neither Ctrl+C or VDU3 will stop the data going to the printer.

*FX3,16 prevents the use of SPOOLING. I tried this and found that my micro went through the same process of waiting for record and Return to be pressed. It then appeared to be recording information.

Afterwards I checked to the file and found that the file was written onto the tape but that there was no information present.

Can any of you think of a

possible reason for wanting to use *FX3,16?

*FX3,64 disables the printer driver unless VDU1 is sent first. Now Ctrl+B will not activate the printer. However, the following will send the word John to the printer:

```
VDU1,74,1,111,1,104,
1,110,1,13
```

Program II allows the computer to be set up to use either a parallel or serial printer providing suitable hardware is available.

The Plus 1 has a parallel printer output. This means the data is sent to the printer along eight parallel wires allowing eight bits of information to be sent simultaneously. Serial output is sent along a single wire bit by bit.

The rate at which data is sent down that wire is known as the baud rate. The program can also be used to set the baud rate for a particular printer.

One drawback to all this is

that at the moment the Plus 1 has no serial output port. It's planned that a cartridge unit will be provided that gives serial output.

Now let's leave *FX3 and go onto *FX5,0 which disables the output by directing the data to a sink, the computer equivalent of a black hole.

This means that the output never reaches the printer.

After *FX5 has been sent then Ctrl+B followed by LIST and Return will not give a listing on the printer.

This may seem a bit daft, but it could be used for testing a printer routine without using up yards of paper.

Let's look at other members of the family.

*FX5,1 directs the data to the parallel printer output at the back of the Acorn Plus 1. *FX5,2 causes the data to go to the RS423 interface, if it's present, and *FX8 then sets the baud rate.

*FX245 can be used to find out which form of printer

```
10REM PROGRAM I
20PROCfx(202,0,0)
30END
40DEFPROCfx(aZ,xZ,yZ)
50osbyteZ=&FFF4
60AZ=aZ: xZ=xZ: yZ=yZ
70PRINTTAB(4)*"FX";AZ,"
; xZ","; yZ
80responseZ=USR(osbyteZ)
90aZ=responseZAND&FF
100xZ=(responseZAND&FF00)
DIV&100
110yZ=(responseZAND&FF0000)
DIV&10000
120rZ=(responseZAND&FF000000)
DIV&1000000
130PRINTTAB(4)*"a"TAB(9)*"x
TAB(14)*"y"TAB(19)*"r"
140PRINTTAB(4);aZTAB(9);x
ZTAB(14);yZTAB(19);rZ
150PRINTTAB(4)*"&";*aZTAB(
9)*"&";*xZTAB(14)*"&";*yZ
160ENDPROC
```

Program I

```
10REM PROGRAM II
20REPEAT
30VDU12,10,10
40RESTORE220
50FORkZ=1TO9
60READa$
70PRINT;kZ"...a$
80NEXT
90PRINT"Enter choice 1-
9 ";
100choiceZ=GET-40
110UNTILchoiceZ<10ANDchoi
ceZ>0
120IFchoiceZ=1THEN*FX5,1
130IFchoiceZ>1THEN*FX5,2
140IFchoiceZ=2THEN*FX8,1
150IFchoiceZ=3THEN*FX8,2
160IFchoiceZ=4THEN*FX8,3
170IFchoiceZ=5THEN*FX8,4
180IFchoiceZ=6THEN*FX8,5
190IFchoiceZ=7THEN*FX8,6
200IFchoiceZ=8THEN*FX8,7
210IFchoiceZ=9THEN*FX8,8
220PRINT""Choice ";choic
eZ" set.""
230DATA"parallel","serial
75","serial 150","serial 3
00","serial 1200","serial 2
400","serial 4000","serial
9600","serial 19200"
240END
```

Program II

output is being used. PROCfx(245,0,255) in Program I will return the required value in x%.

When listing and printing texts the computer sends a character 13 at the end of each line. This causes some printers to move the typehead to the left side of the paper and then move the paper forward one line.

Other printers do not have automatic line feed as it is called. Usually this can be adjusted inside the printer by altering one of the small DIP switches that are usually located in the printer at the most inaccessible place.

Each machine is different, so the manual has to be consulted.

The action of the printer can also be affected by using *FX6. If your printer produces a blank space between each line of text then *FX6,10 may help.

If the printer keeps printing on top of itself and doesn't move the paper forward properly then *FX6,0 solves the problem. Unlike many calls, this one is not changed if Break is pressed.

PROCfx(246,0,255) can be used to read the value set by *FX6. If, after the call has been made, X is 10, then the default setting is in action.

This prevents line feed characters being sent to the computer unless preceded by VDU1.

As an aside, can I point out that osbyte call 123 is used by machine code printer drivers to tell the computer that the printer is no longer required? *FX5 is then used to restart the driver.

You never know when that bit of information will come in useful.

An important technique that enables you to send text to the printer without it going to the screen uses *FX3,10. This disables the VDU drivers and permits the printer to work without the use of Ctrl+B or VDU2.

When the printing or listing has finished *FX3,0 resets the micro to the default status.

The Acorn Plus 1 has another interface, the ADC (Analogue to Digital) port. This samples input from a continuously varying source and turns it into numbers (digits) that the

By
**JOHN
WOOLLARD**

Electron can use.

It works on four input channels, taking information from each one in turn and also allows digital input from two switches.

It's frequently used with joysticks. The movement of the joystick provides the analogue input, the fire buttons providing the digital input.

There's a series of *FX calls that are directly concerned with this interface. The first, *FX13,3, switches off the four analogue channels and the two digital inputs. *FX14,3 switches them back on again.

*FX16 is used to switch on a selected number of the channels.

If two joysticks are being used then all four channels will be necessary as each joystick requires one channel for up and down movement and

another for left and right movement.

*FX16,0 disables sampling. This means the computer does not keep checking to see if the ADC has changed value.

*FX16,1 enables channel 1 while *FX16,n enables channels 1 to n. If n is greater than four then it's treated as four.

*FX16,2 would be used to operate one joystick. As games paddles only require one channel it's possible to design a program where four people, each with a paddle, play in competition.

Normally each of the four channels is sampled in turn. Osbyte 17 is used to force a conversion in the named channel. Even if the channels have been disabled using *FX16,0 the numeric conversion will still take place. *FX17,1 activates channel 1.

Program III has been de-

signed to illustrate the techniques outlined above. It also enables you to compare the accuracy and sensitivity of joysticks.

Lines 170, 200, 230 and 260 use *FX17 to force conversions and then output the value of each channel. Lines 290 and 300 are used to discover whether a fire button is being pressed.

The program leaves a trail of characters indicating the extent and fineness of movement of the joystick. If the REM is removed from lines 150 and 160 no trail is visible.

When using the program you may find that moving the joystick up and down moves the marker left and right. This is due to the way the joystick is wired to the ADC plug.

To overcome this the struc-

```

10REM PROGRAM III
20MODE0
30VDU19,1,3,0,0,0
40PRINTTAB(5,3)"Analogue
Port Analyser"
50*FX163,120,0
60*FX16,0
70FOR kX=1 TO 3
80MOVE0,kX*256: DRAW1024,
kX*256
90MOVE512,1024: DRAW512,0
100MOVE511,1024: DRAW511,0
110NEXT
120adc1X=0: adc2X=0: adc3X=
0: adc4X=0
130REPEAT
140VDU5
150REM MOVE1024-adc2X,adc
1X:VDU32,127
160REM MOVEadc3X,1024-adc
4X:VDU32,127
170*FX17,1
180REPEAT: UNTILADVAL(0)DI
V256=1
190adc1X=ADVAL(1)DIV64
200*FX17,2
210REPEAT: UNTILADVAL(0)DI
V256=2
220adc2X=ADVAL(2)DIV64
230*FX17,3
240REPEAT: UNTILADVAL(0)DI
V256=3
250adc3X=ADVAL(3)DIV64
260*FX17,4
270REPEAT: UNTILADVAL(0)DI
V256=4
280adc4X=ADVAL(4)DIV64
290leftX=ADVAL(0)AND1
300rightX=ADVAL(0)AND2
310MOVE1024-adc2X,adc1X:V
DU76
320MOVEadc3X,1024-adc4X:V
DU82
330VDU4
340a$="ADVAL("b$")="
350PRINTTAB(65,5)a$;1;b$;
adc1X*64
360PRINTTAB(65,8)a$;2;b$;
adc2X*64
370PRINTTAB(65,11)a$;3;b$;
;adc3X*64
380PRINTTAB(65,14)a$;4;b$;
;adc4X*64
390PRINTTAB(65,20)a$;0;"
AND1="leftX
400PRINTTAB(65,23)a$;0;"
AND2="rightX
410UNTILINKEY(0)=32
420MODE6
430END

```

Program III

From Page 27

ture of lines 150, 160, 310 and 320 must be changed. To end Program III simply press the space bar.

Osbyte calls can be put into machine code programs. In fact, they're very easy to use.

The three values following the *FX are placed in the accumulator, X and Y registers respectively. The call is made using JSR&FFEE.

Program IV watches the keyboard and prints the character of any key pressed.

If no key is pressed within a set time then an asterisk is printed. It demonstrates how osbyte calls are made in assembly language.

I have placed the code at location &900 onward but it can be put elsewhere by changing the value following P% in line 30.

Line 50 takes the values from the processor status flags, accumulator, X and Y registers in turn and places them on the stack. This prevents the routine losing valuable data.

Line 130 replaces each of the values in the correct

registers. The osbyte call is made in lines 50 and 60. It is the same as *FX129,100,0 which in Basic is INKEY(100).

The program can be used to test the speed of a typist. Each time there is a wait of more than one second the computer inserts a star.

By reducing the value set in X (line 60) the speed of typing must be increased. It ends when the text reaches line 21 of the screen.

Program V is a second illustration of the use of osbyte calls in machine code programs. It's a screen text dump that operates in any mode.

The routine has been placed from &900 onward, but may be relocated by changing the value in line 70. The locations &70 to &74 store values it uses. They are shown in Table I.

The first osbyte call is at line 100. *FX3,64 is used so that a character is only sent to the printer when it is preceded by VDU1 or its equivalent.

This means that the printer driver can be activated near the start (line 110) and not continually switched on and off during the program.

The second osbyte call at line 120 reads the number of the mode in use. The value is stored at location &70.

Lines 140 to 240 change the values stored at &71 and &72 to the number of spaces across and the number of lines down the screen.

Address	Contents
&70	Screen mode value
&71	spaces across screen
&72	lines down the screen
&73	counter, position of cursor across
&74	counter, position of cursor down
&75	number of character at cursor position
&76	original horizontal position of cursor
&77	original vertical position of cursor
Start of assembly: &0900	
End of assembly: &09BC	

Table I: Memory locations of Program V

These values are used to terminate the two nested loops between lines 260 and 370. They cause the cursor to track from the top righthand to the bottom lefthand corner of the screen.

Line 320 contains the *FX135 call that reads the character at the cursor position and places its value in &74. Line 340 sends VDU1 and line 350 then sends the character to the printer.

Finally, before the routine ends, the default output stream is reset using *FX3,0 at line 380.

The printer driver is shut down using the equivalent of VDU3 (Ctrl+C) at line 390. Line 400 replaces the original

values in the accumulator, X and Y registers.

And now, here's a challenge. This routine does not record the position of the cursor at the moment it is called. At the end of the program the cursor is left at the bottom of the screen and causes scrolling.

An osbyte call with A=134 can be used to read the original position of the text cursor. X returns the horizontal (POS) and Y the vertical (VPOS) values.

They could be stored in &76 and &77 and then used to place the cursor at its original position at the end of the program. It's up to you. Happy programming.

```

10REM PROGRAM IV
20FORoptX=0TO2STEP2
30PX=&900
40[OPToptX
50PHP:PHA:TXA:PHA:TYA:PH
A
60LDA#129:LDX#64:LDY#0
70JSR&FFF4\INKEY(1024)
80CPY#FF:BEQnokeypress
90TXA:JMPprint
100.nokeypress LDA#42
110.print JSR&FFEE
120.rts
130PLA:TAY:PLA:TAX:PLA:PL
P
140RTS
150]
160NEXT
170CLS
180PRINT""Please type ""
190REPEAT
200CALL&900
210UNTILVPOS>20
220PRINT""The End""
230END
  
```

Program IV

```

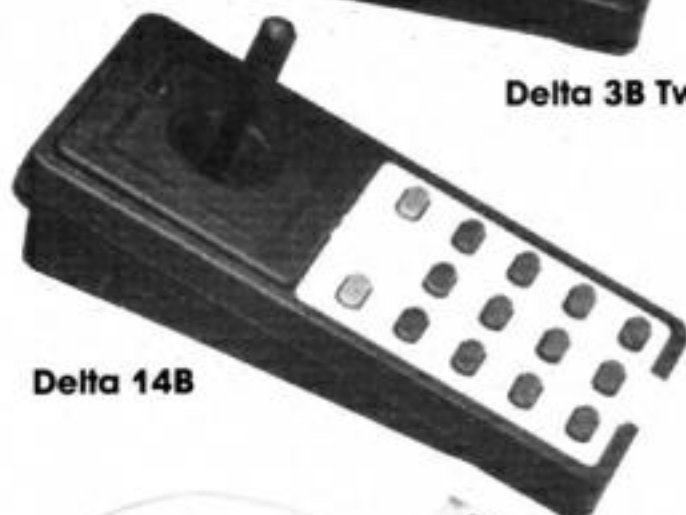
10REM PROGRAM V
20PROCtextdumpsetup
30CALL&900
40END
50DEFPROCtextdumpsetup
60FORoptX=0TO2STEP2
70PX=&900
80[OPToptX
90PHP:PHA:TXA:PHA:TYA:PH
A
100LDA#3:LDX#64:LDY#0:JSR
&FFF4
110LDA#2:JSR&FFEE
120LDA#87:LDX#0:LDY#0:JS
R&FFF4
130STY&70
140LDA#40:STA&71:LDA#32:S
TA&72
150LDA#70:CMP#0:BEQmode0
160LDA#70:CMP#2:BEQmode2
170LDA#70:CMP#3:BEQmode3
180LDA#70:CMP#5:BEQmode5
190LDA#70:CMP#6:BEQmode6
200.mode0:LDA#80:STA&71:J
MPstart
210.mode2:LDA#20:STA&71:J
MPstart
220.mode3:LDA#80:STA&71:L
DA#25:STA&72:JMPstart
230.mode5:LDA#20:STA&71:J
MPstart
240.mode6:LDA#25:STA&72:J
MPstart
250.start
260LDA#0:STA&74
270.down:LDA#0:STA&73
280.across
290LDA#31:JSR&FFEE
300LDA#73:JSR&FFEE
310LDA#74:JSR&FFEE
320LDA#87:LDX#0:LDY#0:JS
R&FFF4
330STX&75
340LDA#1:JSR&FFEE
350LDA#75:JSR&FFEE
360INC&73:LDA&73:CMP&71:B
NEacross
370INC&74:LDA&74:CMP&72:B
NEdown
380LDA#3:LDX#0:LDY#0:JSR&
FFF4
390LDA#3:JSR&FFEE
400PLA:TAY:PLA:TAX:PLA:PL
P
410RTS
420]
430NEXT
440ENDPROC
  
```

Program V

JOYSTICKS— THE COMPLETE SOLUTION



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and
Delta 3B
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Datapad 16B

DELTA 3B TWIN—BBC B or ELECTRON PLUS 1 £19.95

A direct but improved alternative for the original ACORN joysticks, with 2 joysticks wired to one plug. As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.

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Our original ACORN/BBC handset. The same super light joystick, but the long life buttons, which have been video game tested for many years, increased to 14 in number. A DELTA 14B/1 is needed to run the keypad but a 14B on its own will work as a joystick and fire buttons, so you can always add the 14B/1 to it later.

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The A/D/USER PORT interface box. This gives simultaneous access to both the analogue port, for the joystick part and the user port, for the keypad. Two handsets can be plugged into the box giving a total of 24 user definable keys.

Full instructions are provided to include the keypad in your own programs even in BASIC or for the non-programmer a DELTA DRIVER cassette is available with keyboard to joystick/keypad conversions and keypad set up programs.

DELTA 3S—ELECTRON with switch joystick interface £12.00

For an ELECTRON with a switched joystick interface (Not a PLUS 1) this gives you the same delightful light, fast action of the DELTA joysticks but fitted with a 9 way D plug as per Atari, Commodore, etc. and will run on First Byte interface or similar.

DELTA ASC not illustrated £9.95

This little box plugs in series with your analogue joystick to alter its characteristics simply by using a switch. In one set up the joystick will act like a switched joystick, i.e. a slight movement will act as if the joystick has been pushed hard over. In the other mode the joystick only covers the centre half of the A/D converter so that it takes twice as much movement to give the same effect. This makes it much easier to make delicate adjustments to programs like flight simulators.

DATAPAD 16B £39.95

A commercial spec. 16 way keypad. Full travel mechanical keys with double shot moulded keycaps mounted in a low profile metal case. The keys are marked with calculator legend, but the software included allows the pad to be defined as any keys, including function keys or single byte VDU commands such as PRINTER ON/OFF. No tampering with the computer as it fits onto the user port.



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I'VE been somewhat overwhelmed with letters this month, mainly about *Sphinx Adventure*, so I have decided to do a special on it sometime within the next few months.

While we are on the subject of letters, can I ask you to do me a few favours? Please could you put your Christian names or at least whether you are a Miss, Mr or Mrs.

Also try to limit your questions - I don't have time to tell people who write in asking how to solve a complete adventure... and quite a few people do just that.

It's confession time again. I have had a letter saying that you go up in the catacombs in *Sphinx Adventure* but my map of them only shows the normal compass points, so I might have been giving readers the wrong advice.

Can anyone send me a map of the catacombs only? It seems I have also been talking about a ming vase in *Sphinx*. I don't think there is one.

I must have got confused with *Classic*, so please accept my apologies. Nice one Shaun, for spotting it! Also, much to my shame, I can't remember how to get out of the castle in *Eye of Zoltan*. Can anybody help?

James Howdle has written in asking for a help sheet for adventures in general. I don't have one, but perhaps a compilation of my columns plus some maps and solutions would make a good book.

We have had an excellent response to the Adventure Top Ten so I'll print another one shortly.

Colin Harris asks for Softek's address so that he can buy *Eye of Zoltan*. Try: 12/13 Henrietta Street, Covent Garden, London, WC2E 8LH, phone 01-240 1422/7877.

He also asks me to state whether an adventure has graphics or not when I review it. In future I will mention graphics only if the program has them and so if there is no mention, it's text only.

David Sturgess says that to exorcise the ghost in *Five Stones of Anadon* you must get the book and silver cross.

The bugs in *Pyramid of Doom* and *TKV* (Twin Kingdom Valley) have reared their heads again. *TKV* will not allow you to load a saved game in some versions, so

Wanted, a quick tour of the catacombs

make sure yours will before you buy it.

And in some versions of *Pod* you can't get into the pyramid. In this case send your copy back to Adventure International who will be delighted to exchange it.

Phillip of Bognor Regis is having problems with *Savage Island Part 1*. He is stuck on the atoll, getting a light and also wants to know what the

You have, Robert. Mark Seaman says he has rescued the princess but hasn't received the silver key. Are you sure you have rescued her? Were you wearing the amulet?

Simon Bellamy wants to know what the scratches on the wall with the eggs mean in *Hulk*. I don't know, do you?

Nick Butler, who's working his way through Pettigrew's diary, wants to know which

booklet and enclosed it with the program.

Neill Milton says the ending in many adventures is rather anti-climatical. He also thinks that a certificate to show that you have finished would be nice. I agree. Software houses, are you listening?

Matthew France is stuck in *Galadriel in Distress*. I still have not seen this, so can't help. He wants to know how to get the toad out of the middle of the pond.

Peter Barry writes to ask if I have ever been on *MUD* - Multi User Dungeon. As soon as I have my modem I'll be in there.

He has written out a question and answer sheet for *Sphinx*. It doesn't cover everything as he hasn't yet crossed the lake, but it does cover a lot of problems I am asked about. It's free to anyone who sends in an SAE.

The *Greedy Dwarf*, which I still haven't seen, is causing Tony Banks, among many others, a lot of problems. Namely, how do you get the sword to kill the spider and how do you get past the rats. Will some kind person put them out of their misery?

H. Reynolds wants to know how to get past the iron statue in *Pyramid of Doom*. Is there one, and if so how do you get past it?

Carl Ellis and John Trotter are two more adventurers, or is it arc-venturers, that are having problems with *SIM*.

S. Flook has written in to say that the answer to Phillip Dawson's problem in *Castle Frankenstein* is to hammer the metal rod into the ground and then tie the rope to it.

The rope must be tied to the metal ring and then Phillip will be home and wet.

Paul Taylor asks how to get the ants to free ant man and whether you can deflect the beams (?) with the mirror in the *Incredible Hulk*.

David Anderson can't find



significance of the cannon fire is. Can anybody help him?

Julian Holden can't get through the stone door behind the wall in the plain room in *Sorcerer of Claymorgue Castle*. Matthew Hall has eight of the stars but can't find the others. He wants to know how to get the can from the battlements, and is also stuck with that stone door.

K. and D. Harper need some help with *Gremlins*. What do you do with the electric drill and saw, what do you do in the pub, what's the mail box for and of what use is the film in the cinema? Does anyone know?

Giles Harris wants to know how to attach the pipe from the bar to the pipe from the gas bottle and thus enter it into the hole drilled into the metal plate.

Robert Carlton has completed *TKV* but doesn't believe that he has completed it when he types in the code I gave in the special on *TKV*.

barber you should choose in the European trek and why. Grant Rencourt wants to know how to get to the arcade, the natural history museum and where are the gunmen, Eddy the crook and Scarface.

He can't get to the island in the Serpentine lake now that he has the boat. He says he has tried to row it.

Sean McDougal has written in with a good tip for *Sphinx*. He says that the program doesn't flush the function keys when it loads and so you can program them. He puts the first 15 moves into one key and other useful commands into the others. Sounds like a good idea.

Geoff Poole wants to know why some purchasers of *Sphinx* got a help booklet with it and some did not. The reason is that originally you got a form that you should send to Acornsoft for a free clue. However they were inundated with requests for help and brought out the

the petrol or get into the wagon in **Circus Adventure**. I haven't seen any of the Brian Howarth adventures yet, but would very much like to. Meanwhile can anybody help David?

Stuart Nicholls wants to know how to get down the volcano in **Countdown to Doom**. Can you get down there? M.J. Plumb wants to know what the metal cube is for - so would I!

Finally, lots of readers have asked how to plant the bean on the island in **Eye of Zoltan**. One of my old maps says, DROP BEAN, DROP WATER. I think this works.

Hints Department

Scott Mancriff can't find the will, map the maze to the solicitor's office or get out of the room north of the danger room in **Philosophers Quest**. Reunite pet and mistress.

From the smooth corridor there are eight locations to map including the office. Try emulating Long John Silver without the crutch.

Alan Riddell is having problems with **Pirate Adventure**. To get to Treasure Island, build a boat.

Don't try and get the shovel through the crack in the wall, try finding a way of getting round to the other side of the crack through a different entrance. Yes, there are keys to be found, but keep it under wraps.

Derek Willoughby and Simon Bellamy would like some answers to their problems with the **Incredible Hulk**. To stop the natter egg from exploding and get the bio gem you'll need to have a healthy appetite.

I don't think you have to kill the ants and I don't think the scratches mean anything. To pull the ring, remember what Strange said.

M.J. Plumb and Stuart Nicholls have some questions about **Countdown to Doom**. The glacier is UP from the landing area and you will be able to use the phaser somewhere there.

You should be able to get out of the artefact if you do everything correctly. Don't forget that the shapes appear in a random order and that they might not be the same the

next time you visit.

To catch the blob, use the net. This will answer your problems with the monster, spacesuit and should make the platform easier to handle.

Larry Horsefield wants to know whether anything can be done at the patch of wet (quick?) sand and at the nearby dead end in **Sphinx** and whether anything can be done in the shrine. Not as far as I know.

Timothy Moore wants to know how to get past the pirate. Make a map, and you'll see that you can avoid him completely.

Chris Dymock can't get past the fiery walls. Don't drop your bottle to fill it!

Stephen Adler can't find the bear. Explore the locations nearest to the south side of the troll's bridge.

Jonathan Ornstein and Shirley Ann Haddy among many others, can't find the sphinx in the desert, so I will give you the route I use from the pirate's hideout:

**N-E-N-S-E-W-E-S-N-S-
E-W-E-S-N-S-E-W-E-S-N**

Sarah and Simon Barber want to know how to get out of the serpent and why they can't get further than the canyon and glacier. Strike a light. You can't go any further. You need two magic items to cross the glacier.

Stephen Snell wants to know where the stake is. Beyond the goblins near the pirate's hideout.

M.A. Messam should leave things at the Sphinx when he has his hands full. Graeme Daniels, Louise Dunmore, Alan Riddell want directions to the vampire's castle. Somebody recently brought my route there into doubt however, I go:

S-S-N-E-W-S-D-D-U

Please let me know if anyone finds this doesn't work.

Adrian Turner and Stephen Parkinson want to know how to kill the dwarves. Keep throwing the axe at them.

Ernest Howard and Larry Horsefield want to know if you can explore the locations by the crocodile without either feeding or getting killed by it.

Good question! I don't think so, but to be honest I have never tried.

Brian Murphy is having

trouble getting the time crystal into it's slot in **Stranded**. If I remember rightly, you simply INSERT CRYSTAL.

Adam Gladstone has shot the robot but cannot now find the way into the ship. **Stranded** has a very limited vocabulary, try GO AIRLOCK and PICK LOCK.

Fantasia Diamond has reared its head again, and I still don't know if this is available on the Electron. Heather Owen and Nick Butler want to know how to get past the river and what to do in the dingy cellar. You can't get across. Polish the window.

Andrew Cunningham has some questions also. How does he open the musical and brown door, how does he unlock the chest behind the secret door and how does he open the trap door?

Give the conductor the tools of his trade. With no difficulty as far as I know. Keep examining it. By lifting it, I think.

Rui Teirnao keeps getting arrested for indecent exposure when he tries to change into the tweed suit in **Hampstead**. Sorry Rui, I didn't realise that there were two suits when I asked if that was the business suit.

However, the privacy of your own home is still the best place.

Tony Banks, Derek Willoughby and many others have written in with problems with **Greedy Dwarf**. Drink the liquid to get through the gate, use the handle and head to make the axe and since I'm giving away routes through the mazes this month, try:

**W-W-S-DROP
SAUSAGE-N-NE-S-
JUMP E**

to get from the cavern of shadows to the silver room.

Incidentally, I am very

grateful to Eve Thompson for her maps of Greedy Dwarf.

S. Flook wants to know whether there is a way past the giant squid in **Kingdom of Klein**. No, it's a red squid. Ray Bray wants to know what the bucket and spade are for, when to break the egg and what to use the cube for. Building a sandcastle. Break the egg in the long corridor. It's one of the solids!

They are both also having problems with **Quest for the Holy Grail**. To get across to the island build a raft. To move the huge stone, put the monk's present in the niche. The sapphire sword will kill the blue knight, you'll find it on the island. As for the black knight, there is no sword for him.

They, along with Simon Bellamy and Simon Webb, are having trouble with **Wheel of Fortune**.

To get across the pit after scaring off the dragon, have you still got the ladder? To get the farmer to leave the field tell him about the bull. No, the watch cannot be repaired and should be ignored.

To get into the building go round the back and open the door. The idea is not to let the beggar get the matches. Once he does you can't get them back.

What to type in to get the bucket? GET BUCKET. I think you haven't EXTENDED the ladder.

What to type in to go down the well? CLIMB INTO BUCKET, and SAY TO BEGGAR LOWER ME.

Ray Bray and Derek Willoughby want to know how to get the last treasure and how to catch the owl in **Adventure**. Go into the scrubland past the dragon, drop one of your treasures and steal it back. You can't catch the owl.

It will come if you hoot, though.

Competition Corner

YOU might remember the competition we ran in July. The winner was Ray Bray, of Cheadle Hulme and the answers were:

- Turn off your lamp and hoot.
- Take 15 treasures to the building and return to the hall to get into the repository.
- No, there are no secret

entrances in the inner sanctum.

Nobody seemed to know how to get out of the repository, so if anyone can send me a map and solution to show how to get out I will reward them with a copy of Pettigrew's Diary, a superb semi-graphical adventure from Shards.

KARATE WARRIOR

AS a pupil at the temple of Tanhii you have been trained in Taijutsu, the Ninja's art of unarmed combat. Now comes your final test. Before leaving the temple to become a Warrior of the Night you must fight against another opponent who wishes to qualify like you.

Both of you are fantastic fighters, with hands and feet of steel. Your opponent eyes you, then circles to the left. You step to the right, following the curve of the arena.

He stops and leaps forward, attempting a Tettsui-uchi, but you are quick and adopting the Kokutsu Dachi stance you deliver a block with your right forearm.

Then you whirl round and float into the air. Your feet clasp around his face and you spin, sending him flying with a Teeth of Tiger throw. He lies dazed on the floor. You bow and then leave the arena. You have got your first belt.

The aim of the game is to become a black belt before your opponent does. This is done by winning each fall. Both of you start off with white belts and must each win five falls to reach blacks.

Each player has four moves. These are shown below.

Yoko Geri Chudan: Side kick to the ribs or chest.
Kansetsu-Geri: Knife kick to opponent's ankles.
Kakato-Geri: Jumping heel kick to the jaw.
Somersault: Back flip used in retreat.

When striking with a Koko Geri Chudan the player will move forward. This kick is used to advance towards your opponent and is also the most common kick used.

The Kansetsu-Geri is a very useful and effective kick as it is used to topple an unaware opponent. When kicks are being delivered the move can be used to duck or dodge a strike and also to swipe away the foundation leg.

The Kakato-Geri is a spectacular flying kick to the jaw. This kick is very advanced and also safe as you cannot be struck when you are using this move. It can be blocked using a Yoko Geri Chudan or can be dodged using a Kansetsu-Geri.

When you feel uneasy or open to attack a somersault is a very useful move. It is the safest move as you cannot be touched while you are flying

through the air, but it allows your opponent to advance. You cannot always somersault – only when you are far enough away from the edge of the arena.

The game is quite complicated in the way it prints out the men's different positions. Because the characters are so large and there are so many different positions we define the characters for each new position just before we print them.

This is because each man is made up of 12 characters and as there are 12 possible positions of each man we would soon run out of spare character spaces if we tried to define all these at the beginning of the program.

Only the characters for the positions of the man facing right are defined. Then, in the program, we use a small machine code routine which reverses the characters to produce a man facing left. Using this technique we save half the work when defining, and half the work when typing in.



**Win your black belt
in this gruelling
test of Karate skill
by MATTHEW HOLROYD**

守禮
Shurei
The Art of the Martial Arts



PROCEDURES

caller	Calls the machine code routine which reverses the characters.
delay()	Makes a delay.
kick1,2	Controls the normal kicks of the two players.
hikick1,2	Controls the high kicks of the two players.
sweep1,2	Controls the sweeping moves of the two players.
som1,2	Takes care of the somersault.
init	Defines the variables.
stance	
kickchars1,2	
hikchars1,2	
sweepchars1,2	
somchars1,2	
reverse	Machine code routine used to reverse characters.
screen	Draws the screen.
check	Checks when the players are striking and acts accordingly.
deadchars1,2	Characters for the dying men.
man1dead	Displays player 1 dying.
man2dead	Displays player 2 dying.
nextbelt	Works out the next belt for each player.
start	Controls the starting of each fall.
win	Prints the winning screen and draws the winner.
bow	Characters for the bowing men.
inst	Instructions.
freeze	Freeze facility.

VARIABLES

belt1%	Player 1's belt.
belt2%	Player 2's belt.
X%	Player 1's x coordinate.
N%	Player 2's x coordinate.
B%	Set to 1 if striking. 0 if not.
C%	Set to 1 if striking. 0 if not.
E%	The code for player 1's move.
R%	The code for player 2's move.
I%	Controls the animation of player 1's moves.
J%	Controls the animation of player 2's moves.
man\$	Player 1's man.
man2\$	Player 2's man.
M%,O%	Used in PROCcheck to compare to I% and J%.

KEYS USED

PLAYER 1		PLAYER 2
Ctrl		Return
A	Somersault]
S	High kick	:
X	Side kick	/
	Sweeping kick	
W	Sound on.	
Q	Sound off.	
F	Freeze.	
R	Restart.	
I	Instructions.	

Karate listing

```

10REM *** KARATE *
**
20REM *** (C) ELECTRON *
**
30REM *** USER *
**
40REM *** BY M.HOLROYD *
**
50REM *** *
**
60MODE5
70belt1X=1:belt2X=1:ki1X
=0:ki2X=0:PROCreverse:PROCi
nit:PROCscreen:PROCnextbelt
(0)
80SOUND1,2,1,6
85IF @X<>1234567 PROCins
t
90PROCstart
100IFINKEY(-82)ANDEX=0THE
NPROCkick1
110IFINKEY(-73)ANDRX=0THE
NPROCkick2
120IFINKEY(-66)ANDEX=0THE
NPROCkick1
130IFINKEY(-89)ANDRX=0THE
NPROCkick2
140IFINKEY(-67)ANDEX=0THE
NPROCkick1
150IFINKEY(-105)ANDRX=0TH
ENPROCkick2
160IFINKEY(-2)ANDEX=0THEN
PROCsom1
170IFINKEY(-74)ANDRX=0THE
NPROCsom2
180IFINKEY(-34)THEN*FX210
,0
190IFINKEY(-17)THEN*FX210
,1
200IFINKEY(-68)THENPROCfr
eeze
210IFINKEY(-38)THENPROCin
st
220IFEX=1THENPROCkick1
230IFRX=1THENPROCkick2
240IFEX=2THENPROCkick1
250IFRX=2THENPROCkick2
260IFEX=3THENPROCkick1
270IFRX=3THENPROCkick2
280IFEX=4THENPROCsom1
290IFRX=4THENPROCsom2
300GOTO100
310DEFPROCcaller:AX=224:C
ALL&900:ENDPROC

```


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DATA FILE

This one has everything! Create your own file of up to 20 fields, decide the length of the fields then name them. Insert the data by just typing in. Search either the start of a field or anywhere in a field!

Edit simply by the cursor keys. Jump to any record you want. Sort any of the fields not just the normal first one!

Print, with or without the labels, through the Plus One interface to a printer. Save the entire file to cassette.

Create as many files as you want, for any purpose you want and just how you want. The choice is entirely yours!

MICROTYPE

Now firmly established as the 'standard' typing tutor for the BBC, it has been faithfully converted to the Electron. As used in over 200 colleges and schools and in training by ICI, NCB, Shell, Boots, Post Office, British Telecom, etc. etc.

The program gives both exercises and sentences with a complete analysis of your average typing speed, accuracy and the keys mis-typed. If you wish to master the computer keyboard, then this is the program for you.

PERSONAL ACCOUNTS

A tape based accounts program holding up to 450 transactions, accepting debit and credit entries, references and date, with a balance shown after each entry. Any of the 32 categories can be customised; scrolling; edit entries or balance; estimate; status; save and load files. Absolutely ideal for home accounts.

The £8.50/£9.50 games

for just £3.95

FIGHTER PILOT

A true 3D cockpit view of both the runway during take-offs and landings and the enemy fighters which you have to blast out of the sky. Graphics included an accurate radar system and a true combined artificial horizon and turn and bank indicator. Information also shown on fuel, speed, altitude, rate of climb and score. Very active.

CAVEMAN

Take the barrow down the lift into the many galleries of the mine to first dig for diamonds and then for gold. If you manage to escape the monster by astute use of your ladders, you then go down again for coal to refuel the furnace which depletes as the lift keeps working.

MANIAC MOWER

Try your hardest to mow the grass in the park whilst avoiding the maniac mower, whose only aim is to cut you up! To make it harder, you must not go over your own tracks. To make it harder still there are lots of nasties lurking in the grass—all out to get you. To make it even harder still there's a karate expert training in the park, who is very unfriendly!

MUNCHMAN

This is the one that started it all—a real live 'Pacman' for the Electron. Just like the original Arcade game with the ghosties chasing you around as you devour, with of course the energisers which give you the limited time to zap the ghosties.

SNAKE

Seven hectic levels with split screen and even double split screen make this this very active. The snake gets longer and longer as you devour the mushrooms, but avoid the toadstools at all costs. Ideal for young children, whilst by increasing the speed, active enough for experts!

REVERSI

The Electron as your partner for Reversi also known as Othello. Plays to all the rules with the accepted black and white counters on a green board. Moves can be easily entered, with a quick response. All information shown, is shown on the screen with all the scores.

DRACULA ISLAND

A traditional Adventure with all the ingredients of the originals, yet totally logical. A best seller on the BBC, this will give you endless hours of enjoyment, with no little hair-tearing in the attempt to solve it. The aim is to find and kill Count Dracula before he gets you!

RING OF TIME

Another traditional Adventure with some fiendish problems in your quest to find the Ring of Time. Plenty of locations and action make this one of the all-time greats. Both these Adventures have the Kansas split screen display allowing the important information to remain on the screen. Both have the game saving facility and we offer a telephone Help? service.

Any THREE for just £8.50!

The £22.50 Word Processor for £9.95!

This is the one which is designed for the two finger typist and has received rave notices in its BBC version over the past two years. It allows continuous typing with no need to look at the screen, with line ends, margins and everything else automatically sorted out at the printing stage by the Embedded Control Characters, as used by the professional processors.

You can automatically move margins, decrease characters, centre text, right justify, new line, new paragraph, new page, underline, enlarged, emphasised, condensed or normal characters and all by inserting a single letter in the text as you type!

For ease of use, all the main commands toggle on the function keys, which are: Add, Edit, Search, Replace, Save text, Load text, Inform, Exit processor, Enter processor, Clear text, First page, Next page, Previous page, Last page, Insert text, Delete text, Insert buffer, Clear buffer, Format. It will do many other things, printing either continuous or single sheets, emphasised or draft copy, double or single spacing, adjustable page length and optional page numbering. Editing and inserting or deleting text is simplicity itself and a buffer holds 255 characters which can be moved and inserted anywhere in the text.

The program will support the Electron Plus One interface and output to a printer. It is supplied with an extensive manual which contains a unique User Guide.

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From Page 33

```

320DEFPROCdelay(del%):FOR
tyX=1Todel%:NEXTtyX:ENDPROC
330DEFPROCkick1:B%:E%:I%:
:COLOUR3:ON I%GOTO340,370,3
90
340PROCkickchars1:PRINTTA
B(X%,20);blank$:IFX%+2=N%TH
EN60T0370
350X%=X%+1
360PRINTTAB(X%,20);man$:I
X%=2:ENDPROC
370PROCkickchars2:PRINTTA
B(X%,20);man$:IX%=3:IFX%+2=N
%THENPROCcheck
380ENDPROC
390PROCkickchars1:PRINTTA
B(X%,20);man$:PROCstance:PR
INTTAB(X%,20);man$:IX%=1:B%
=0:E%=0:ENDPROC
400DEFPROCkick2:C%=1:R%=1
:COLOUR1:ON J%GOTO410,440,4
60
410PROCkickchars1:PROCcal
ler:PRINTTAB(NX%,20);blank$:
IFNX%-2=X%THEN60T0430
420NX%=NX%-1
430PRINTTAB(NX%,20);man2$:
JX%=2:ENDPROC
440PROCkickchars2:PROCcal
ler:PRINTTAB(NX%,20);man2$:J
X%=3:IFNX%-2=X%THENPROCcheck
450ENDPROC
460PROCkickchars1:PROCcal
ler:PRINTTAB(NX%,20);man2$:P
ROCstance:PROCcaller:PRINTT
AB(NX%,20);man2$:JX%=1:C%=0:R
X%=0:ENDPROC
470DEFPROCchick1:B%=2:E%
=2:COLOUR3:ON I%GOTO480,490
,510
480PROCchickchars1:PRINTTAB
(X%,20);blank$:PRINTTAB(X%,
19);man$:IX%=2:ENDPROC
490PROCchickchars2:PRINTTAB
(X%,19);man$:IX%=3:IFX%+2=N%
THENPROCcheck
500ENDPROC
510PROCchickchars1:PRINTTAB
(X%,19);blank$:PRINTTAB(X%,
20);man$:PROCstance:PRINTTA
B(X%,20);man$:B%=0:E%=0:IX%
=1:ENDPROC
520DEFPROCchick2:C%=2:R%
=2:COLOUR1:ON J%GOTO530,540
,560
530PROCchickchars1:PROCcal
ler:PRINTTAB(NX%,20);blank$:P

```

```

RINTTAB(NX%,19);man2$:JX%=2:E
NDPROC
540PROCchickchars2:PROCcal
ler:PRINTTAB(NX%,19);man2$:JX
%=3:IFNX%-2=X%THENPROCcheck
550ENDPROC
560PROCchickchars1:PROCcal
ler:PRINTTAB(NX%,19);blank$:P
RINTTAB(NX%,20);man2$:PROCst
ance:PROCcaller:PRINTTAB(NX
%,20);man2$:C%=0:R%=0:JX%=1:E
NDPROC
570DEFPROCcsweep1:B%=3:E%
=3:COLOUR3:ON I%GOTO580,590,
610
580PROCcsweepchars1:PRINTT
AB(X%,20);man$:IX%=2:ENDPROC
590PROCcsweepchars2:PRINTT
AB(X%,20);man$:IX%=3:IFX%+2=
N%THENPROCcheck
600ENDPROC
610PROCcsweepchars1:PRINTT
AB(X%,20);man$:PROCstance:P
RINTTAB(X%,20);man$:B%=0:IX
%=1:E%=0:ENDPROC
620DEFPROCcsweep2:R%=3:C%
=3:COLOUR1:ON J%GOTO630,640,
660
630PROCcsweepchars1:PROCca
ller:PRINTTAB(NX%,20);man2$:
JX%=2:ENDPROC
640PROCcsweepchars2:PROCca
ller:PRINTTAB(NX%,20);man2$:
JX%=3:IFNX%-2=X%THENPROCcheck
650ENDPROC
660PROCcsweepchars1:PROCca
ller:PRINTTAB(NX%,20);man2$:
PROCstance:PROCcaller:PRINT
TAB(NX%,20);man2$:JX%=1:C%=0:
RX%=0:ENDPROC
670DEFPROCsom1:E%=4:COLOU
R3:ON I%GOTO680,700,710,720
680IFX%-3<=2THENEX%=0:ENDP
ROC
690PRINTTAB(X%,20);blank$
:XX%=X%-1:PROCsomchars1:PRIN
TTAB(X%,19);man$:IX%=2:ENDPR
OC
700PRINTTAB(X%,19);blank$
:XX%=X%-1:PROCsomchars2:PRIN
TTAB(X%,18);man$:IX%=3:ENDPR
OC
710PRINTTAB(X%,18);blank$
:XX%=X%-1:PROCsomchars1:PRIN
TTAB(X%,19);man$:IX%=4:ENDPR
OC
720PRINTTAB(X%,19);blank$
:PROCstance:PRINTTAB(X%,20)
;man$:SOUND3,-12,1,2:SOUND0

```

```

,-15,6,2:IX%=1:E%=0:ENDPROC
730DEFPROCsom2:R%=4:COLOU
R1:ON J%GOTO740,760,770,780
740IFNX%+3>=15THENRX%=0:END
PROC
750PRINTTAB(NX%,20);blank$
:NX%=NX%+1:PROCsomchars1:PROC
caller:PRINTTAB(NX%,19);man2
$:JX%=2:ENDPROC
760PRINTTAB(NX%,19);blank$
:NX%=NX%+1:PROCsomchars2:PROC
caller:PRINTTAB(NX%,18);man2
$:JX%=3:ENDPROC
770PRINTTAB(NX%,18);blank$
:NX%=NX%+1:PROCsomchars1:PROC
caller:PRINTTAB(NX%,19);man2
$:JX%=4:ENDPROC
780PRINTTAB(NX%,19);blank$
:PROCstance:PROCcaller:PRIN
TTAB(NX%,20);man2$:SOUND3,-1
2,1,2:SOUND0,-15,6,2:JX%=1:R
X%=0:ENDPROC
790DEFPROCinit
800ENVELOPE1,3,1,0,0,1,1,
2,126,-3,71,-10,126,34:ENVE
LOPE2,3,0,0,0,0,0,121,-10
,-5,-2,120,120
810X%=5:NX%=12:B%=0:C%=0:I
X%=1:JX%=1:RX%=0:EX%=0:drawX=1
820VDU 23,250,&63,&63,&32
,&34,&38,&26,&23,&43,23,251
,&61,&6F,&33,&32,&3E,&22,&2
2,&41,23,252,&71,&7E,&32,&3
2,&3C,&24,&22,&43,23,253,&0
0,&7C,&7F,&08,&08,&0C,&0C,&
0C,23,254,&7F,&60,&30,&3C,&
30,&20,&3C,&43
830VDU 23,248,&FF,&00,&00
,&00,&00,&00,&00,&00
840blank$=CHR$(32)+CHR$(3
2)+CHR$(32)+CHR$(10)+CHR$(8
)+CHR$(8)+CHR$(8)+CHR$(32)+
CHR$(32)+CHR$(32)+CHR$(8)+C
HR$(8)+CHR$(8)+CHR$(10)+CHR
$(32)+CHR$(32)+CHR$(32)+CHR
$(10)+CHR$(8)+CHR$(8)+CHR$(
8)+CHR$(32)+CHR$(32)+CHR$(3
2)
850man$=CHR$(224)+CHR$(22
5)+CHR$(226)+CHR$(10)+CHR$(
8)+CHR$(8)+CHR$(8)+CHR$(227
)+CHR$(228)+CHR$(229)+CHR$(
10)+CHR$(8)+CHR$(8)+CHR$(8)
+CHR$(230)+CHR$(231)+CHR$(2
32)+CHR$(10)+CHR$(8)+CHR$(8
)+CHR$(8)+CHR$(233)+CHR$(23
4)+CHR$(235)
860man2$=CHR$(238)+CHR$(2
37)+CHR$(236)+CHR$(10)+CHR$

```

```

(8)+CHR$(8)+CHR$(8)+CHR$(24
1)+CHR$(240)+CHR$(239)+CHR$
(10)+CHR$(8)+CHR$(8)+CHR$(8
)+CHR$(244)+CHR$(243)+CHR$(
242)+CHR$(10)+CHR$(8)+CHR$(
8)+CHR$(8)+CHR$(247)+CHR$(2
46)+CHR$(245)
870ENDPROC
880DEFPROCstance
890REM *** STANCE ***
900VDU 23,224,&00,&00,&00
,&00,&07,&07,&07,&03,23,225
,&00,&00,&00,&00,&00,&00,&0
0,&00,23,226,&00,&00,&00,&0
0,&00,&00,&00,&00,23,227,&0
0,&3C,&63,&60,&C0,&E0,&70,&
1C,23,228,&00,&60,&90,&18,&
18,&18,&2C,&2C
910VDU 23,229,&00,&00,&00
,&00,&00,&00,&00,&00,23,230
,&0C,&00,&00,&0F,&0F,&0F,&1
E,&1C,23,231,&26,&46,&41,&C
3,&E0,&F0,&F0,&78,23,232,&0
0,&00,&00,&00,&00,&00,&00,&
00,23,233,&3C,&3C,&38,&38,&
38,&38,&20,&F0
920VDU 23,234,&38,&3C,&1C
,&1C,&1C,&1C,&00,&0E,23,235
,&00,&00,&00,&00,&00,&00,&0
0,&00
930ENDPROC
940DEFPROCkickchars1
950REM *** KICK 1 ***
960VDU 23,224,&00,&00,&00
,&00,&00,&1C,&1E,&1E,23,225
,&00,&00,&00,&00,&00,&00,&0
0,&00,23,226,&00,&00,&00,&0
0,&00,&00,&00,&00,23,227,&0
E,&00,&19,&60,&60,&C0,&E0,&
74,23,228,&00,&40,&A0,&38,&
3C,&4C,&46,&46
970VDU 23,229,&00,&00,&00
,&00,&00,&00,&00,&00,23,230
,&1C,&00,&11,&1C,&1E,&1E,&1
E,&1C,23,231,&42,&41,&03,&E
0,&F0,&F0,&7C,&3C,23,232,&0
0,&00,&00,&00,&00,&00,&00,&
00,23,233,&3C,&3C,&38,&38,&
38,&38,&20,&F0
980VDU 23,234,&1B,&02,&00
,&00,&00,&00,&00,&00,23,235
,&00,&00,&00,&00,&00,&00,&0
0,&00
990ENDPROC
1000DEFPROCkickchars2
1010REM *** KICK 2 ***
1020VDU 23,224,&00,&00,&00

```


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```
,&00,&00,&00,&1C,&1E,23,225
,&00,&00,&00,&00,&00,&00,&0
0,&00,23,226,&00,&00,&00,&0
0,&00,&00,&00,&00,23,227,&1
E,&0E,&01,&18,&60,&60,&C0,&
E0,23,228,&00,&00,&A0,&3B,&
3E,&47,&40,&40
```

```
1030VDU 23,229,&00,&00,&00
,&00,&00,&40,&C0,&00,23,230
,&74,&1C,&01,&1F,&1F,&1E,&3
C,&3C,23,231,&40,&7F,&FF,&F
F,&E0,&00,&00,&00,23,232,&6
C,&FC,&E8,&C0,&00,&00,&00,&
00,23,233,&3C,&3B,&3B,&3B,&
3B,&3B,&20,&F0
```

```
1040VDU 23,234,&00,&00,&00
,&00,&00,&00,&00,&00,23,235
,&00,&00,&00,&00,&00,&00,&0
0,&00
```

```
1050ENDPROC
1060DEFPROCchikchars1
1070REM *** HIKICK 1 ***
1080VDU 23,224,&00,&0E,&0F
,&0F,&0F,&27,&30,&70,23,225
,&00,&00,&00,&00,&00,&20,&3
0,&30,23,226,&00,&00,&00,&0
0,&00,&00,&00,&00,23,227,&6
0,&C0,&C0,&60,&28,&18,&0E,&
0E,23,228,&5B,&4C,&46,&01,&
01,&00,&40,&E0
```

```
1090VDU 23,229,&00,&00,&00
,&00,&00,&00,&00,&00,23,230
,&1E,&1C,&1C,&0E,&0F,&07,&0
6,&01,23,231,&F0,&7B,&3C,&1
0,&06,&04,&00,&00,23,232,&0
0,&00,&00,&00,&00,&00,&00,&
00,23,233,&03,&06,&00,&00,&
00,&00,&00,&00
```

```
1100VDU 23,234,&00,&00,&00
,&00,&00,&00,&00,&00,23,235
,&00,&00,&00,&00,&00,&00,&0
0,&00
```

```
1110ENDPROC
1120DEFPROCchikchars2
1130REM *** HIKICK 2 ***
1140VDU 23,224,&00,&1C,&1E
,&1E,&1E,&4E,&C0,&C0,23,225
,&00,&00,&00,&00,&00,&C0,&E
0,&60,23,226,&00,&00,&00,&0
0,&00,&00,&00,&00,23,227,&C
0,&D0,&90,&90,&90,&C0,&CF,&
3F,23,228,&B0,&9B,&06,&46,&
40,&C1,&FF,&FF
```

```
1150VDU 23,229,&00,&00,&00
,&00,&06,&F6,&F4,&E0,23,230
,&7F,&7E,&1F,&0F,&03,&00,&0
0,&00,23,231,&FC,&00,&E0,&E
```

```
0,&E8,&18,&00,&00,23,232,&0
0,&00,&00,&00,&00,&00,&00,&
00,23,233,&00,&00,&00,&00,&
00,&00,&00,&00
```

```
1160VDU 23,234,&00,&00,&00
,&00,&00,&00,&00,&00,23,235
,&00,&00,&00,&00,&00,&00,&0
0,&00
```

```
1170ENDPROC
```

```
1180DEFPROCswepchars1
```

```
1190REM *** SWEEP 1 ***
```

```
1200VDU 23,224,&00,&00,&00
,&00,&00,&00,&00,&00,23,225
,&00,&00,&00,&00,&00,&00,&0
0,&00,23,226,&00,&00,&00,&0
0,&00,&00,&00,&00,23,227,&0
0,&00,&00,&00,&07,&07,&07,&
03,23,228,&00,&00,&00,&00,&
00,&00,&00,&00
```

```
1210VDU 23,229,&00,&00,&00
,&00,&00,&00,&00,&00,23,230
,&38,&60,&60,&D0,&D0,&C0,&0
F,&9F,23,231,&20,&30,&30,&5
0,&50,&90,&00,&C0,23,232,&0
0,&00,&00,&00,&00,&00,&00,&
00,23,233,&FD,&F0,&30,&1C,&
1C,&1C,&00,&30
```

```
1220VDU 23,234,&CC,&EC,&F0
,&7B,&3C,&1E,&0E,&01,23,235
,&00,&00,&00,&00,&00,&00,&C
0,&C0
```

```
1230ENDPROC
```

```
1240DEFPROCswepchars2
```

```
1250REM *** SWEEP 2 ***
```

```
1260VDU 23,224,&00,&00,&00
,&00,&00,&00,&00,&00,23,225
,&00,&00,&00,&00,&00,&00,&0
0,&00,23,226,&00,&00,&00,&0
0,&00,&00,&00,&00,23,227,&0
0,&00,&00,&00,&00,&00,&00,&
07,23,228,&00,&00,&00,&00,&
00,&00,&00,&00
```

```
1270VDU 23,229,&00,&00,&00
,&00,&00,&00,&00,&00,23,230
,&07,&07,&3B,&60,&60,&D0,&D
0,&CC,23,231,&00,&00,&A0,&3
0,&30,&58,&58,&90,23,232,&0
0,&00,&00,&00,&00,&00,&00,&
00,23,233,&9E,&9E,&CE,&CE,&
06,&00,&06,&0E
```

```
1280VDU 23,234,&60,&F0,&7C
,&3C,&1F,&0F,&03,&00,23,235
,&00,&00,&00,&00,&00,&E0,&D
C,&3C
```

```
1290ENDPROC
```

```
1300DEFPROCsomchars1
```

```
1310VDU 23,224,&00,&1C,&3E
,&3E,&1E,&0D,&02,&1C,23,225
,&00,&00,&00,&00,&00,&C0,&6
3,&3F,23,226,&00,&00,&00,&0
```

```
0,&00,&00,&00,&00,23,227,&3
0,&18,&1C,&0F,&07,&00,&00,&
00,23,228,&18,&00,&60,&E7,&
00,&BF,&7F,&7F
```

```
1320VDU 23,229,&00,&00,&00
,&C0,&20,&90,&D0,&D0,23,230
,&00,&00,&00,&00,&00,&00,&0
0,&00,23,231,&3F,&01,&03,&0
1,&03,&03,&01,&00,23,232,&D
0,&D0,&C0,&A0,&40,&A0,&D0,&
D0,23,233,&00,&00,&00,&00,&
00,&00,&00,&00
```

```
1330VDU 23,234,&00,&00,&00
,&00,&00,&00,&00,&00,23,235
,&00,&00,&00,&00,&00,&00,&0
0,&00
```

```
1340ENDPROC
```

```
1350DEFPROCsomchars2
```

```
1360VDU 23,224,&00,&00,&00
,&00,&00,&01,&01,&03,23,225
,&00,&00,&01,&03,&E7,&DA,&9
D,&AE,23,226,&C0,&C0,&60,&7
0,&30,&D0,&D0,&E0,23,227,&0
3,&06,&06,&02,&0C,&1E,&3E,&
3E,23,228,&56,&36,&37,&16,&
0E,&1E,&7D,&79
```

```
1370VDU 23,229,&C0,&00,&00
,&00,&C0,&C0,&00,&00,23,230
,&3E,&18,&00,&00,&00,&00,&0
0,&00,23,231,&06,&F0,&00,&0
0,&00,&00,&00,&00,23,232,&0
0,&00,&00,&00,&00,&00,&00,&
00
```

```
1380VDU 23,233,&00,&00,&00
,&00,&00,&00,&00,&00,23,234
,&00,&00,&00,&00,&00,&00,&0
0,&00,23,235,&00,&00,&00,&0
0,&00,&00,&00,&00
```

```
1390ENDPROC
```

```
1400DEFPROCreverse
```

```
1410FORZX=0TO2STEP2:PX=&90
0
```

```
1420[OPT ZX
```

```
1430 STA&7E:CLC:ADC#12
:STA&7F
```

```
1440.rev LDX#&70:LDY#0
```

```
1450 LDA&7E:STA&70
```

```
1460 LDA#&A:JSR&FFF1
```

```
1470 LDA#0:TAX
```

```
1480.clr STA&01,X:INX:CPX#
0:BNEclr
```

```
1490 LDX#0
```

```
1500.nby LDY#0
```

```
1510.rby CLC:ROR&71,X:ROL&
01,X
```

```
1520 INY:CPY#0:BNErby
```

```
1530 INX:CPX#0:BNErby
```

```
1540 LDA#23:JSR&FFEE
```

```
1550 LDA&7F:JSR&FFEE
```

```
1560 LDX#0
```

```
1570.rep LDA&01,X:JSR&FFEE
```

```
1580 INX:CPX#0:BNErep
```

```
1590 INC&7E:INC&7F
```

```
1600 LDA&7E:CMP#236:BN
Erev
```

```
1610 RTS
```

```
1620]NEXT
```

```
1630ENDPROC
```

```
1640DEFPROCscreen:VDU20,19
,2,4,0;0,17,0,17,131:FORkX=
8TO15:FORmX=2TO17:PRINTTAB
(mkX,kX);CHR$(240):NEXTmX:
NEXTkX
```

```
1650FORfX=8TO16:COLOUR128:
PRINTTAB(6,fX);" ";TAB(13,f
X);" ":NEXTfX:VDU17,130,20,
1,30,10,17,12,26,17,120,20,
0,31,1,0,12,26,20,10,31,19,
0,12,26
```

```
1660VDU20,0,0,19,4,12,26,2
0,0,31,19,29,12,26,17,129,2
0,0,31,0,0,12,26,20,19,31,1
9,0,12,26,20,0,6,19,0,12,26
,20,0,31,19,31,12,26
```

```
1670VDU5:6COL0,0:tX=450:1X
=1000:FORuiX=1TO4:MOVETX,1X
:PRINTCHR$(250)+CHR$(251)+C
HR$(252)+CHR$(251)+CHR$(253
)+CHR$(254):tX=tX+3:1X=1X-3
:IFuiX=3THENGCOL0,3
```

```
1680NEXT:VDU4,23,1,0;0;0;0
;:ENDPROC
```

```
1690DEFPROCcheck
```

```
1700RESTORE1550
```

```
1710FORiX=1TO4
```

```
1720READMX,0X
```

```
1730IFMX=0XAND0X=CXTHENPRO
Cman2dead
```

```
1740NEXTiX
```

```
1750FORgiX=1TO4
```

```
1760READMX,0X
```

```
1770IFMX=0XAND0X=CXTHENPRO
Cman1dead
```

```
1780NEXTgiX
```

```
1790hjX=1:REPEAT
```

```
1800READMX,0X
```

```
1810IFMX=0XAND0X=CXTHENDra
wX=drawX+1:ENDPROC
```

```
1820IFdrawX=8THENGOSUB1800
```

```
1830hjX=hjX+1:UNTILhjX=8
```

```
1840DATA3,1,3,0,1,0,2,0
```

```
1850DATA1,3,0,3,0,1,0,2
```

```
1860DATA3,2,1,3,2,3,3,1,1,
1,2,2,3,3,0,0
```

```
1870ENDPROC
```

```
1880aX=RND(2):IFaX=1THENPR
OCman1dead
```

```
1890IFaX=2THENPROCman2dead
```

```
→
```


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```

2890DEFPROCnextbelt(kl%):C
OLOUR129:VDU28,0,5,19,4,12,
26
2100IFkl%=1THENbelt2%=belt
2%+1
2110IFkl%=2THENbelt1%=belt
1%+1
2120RESTORE2180
2130FORbt%=1TObelt1%:READc
ol1$:NEXTbt%
2140RESTORE2180
2150FORtb%=1TObelt2%:READc
ol2$:NEXTtb%
2160IFbelt1%=6THENPROCwin(
1)
2170IFbelt2%=6THENPROCwin(
2)
2180DATAWhite,Yellow,Green
,Purple,Brown,Black
2190ENDPROC
2200DEFPROCstart:X%=5:N%=1
2:draw%=0
2210COLOUR3:COLOUR129:PRIN
TTAB(2,5);col1$;TAB(13,5);c
ol2$:COLOUR130:VDU28,3,28,1
6,17:CLS:VDU26:PROCBow:COLO
UR3:PRINTTAB(X%,20);man$:CO
LOUR1:PROCcaller:PRINTTAB(N
%,20);man2$:PROCdelay(1600)
2220PROCstance:COLOUR3:PRI
NTTAB(X%,20);man$:COLOUR1:P
ROCcaller:PRINTTAB(N%,20);m
an2$:ENDPROC
2230DEFPROCwin(pl%):*FX9,3
2240VDU23,1,0;0;0;0;:*FX10
,3
2250*FX15,0
2260VDU26,17,129,12,28,1,2
9,18,2,17,128,12,26,28,2,27
,17,4,17,130,12,26
2270COLOUR3:PRINTTAB(7,5);
CHR$(250)+CHR$(251)+CHR$(25
2)+CHR$(251)+CHR$(253)+CHR$
(254)
2280COLOUR0:PRINTTAB(2,7);
"CONGRATULATIONS!":COLOUR3:
PRINTTAB(2,9);"You have rea
ched";TAB(4,11);"the status
of":COLOUR0:PRINTTAB(5,13)
;"BLACK BELT"
2290PRINTTAB(4,26);"PRESS
SPACE":PROCstance:COLOUR3:
IFpl%=2THENCOLOR1
2300PROChikchars1
2310IFpl%=1THENPRINTTAB(9,
18);man$
2320IFpl%=2THENPROCcaller:
PRINTTAB(9,18);man2$
2330*FX15,0
2340SOUND1,-14,40,8:SOUND2

```

```

,-13,41,8:PROCdelay(860):SOUND1,-14,50,2:SOUND2,-13,51,2:PROCdelay(700):SOUND1,-14,50,2:SOUND2,-13,51,2:PROCdelay(700):SOUND1,-15,74,9:SOUND2,-15,75,9:SOUND3,-10,85,9
2350A$=GET$:COLOUR128:CLS:PROCinst
2360DEFPROCbow
2370VDU 23,224,&00,&00,&00,&00,&00,&00,&00,23,225,&01,&03,&03,&03,&0D,&10,&16,&27,23,226,&C0,&E0,&E0,&E0,&C0,&00,&40,&40,23,227,&00,&00,&00,&00,&00,&00,&00,&00,23,228,&27,&2E,&2E,&2D,&2D,&4A,&4A,&5A
2380VDU 23,229,&40,&80,&80,&80,&80,&80,&80,23,230,&00,&00,&00,&00,&00,&00,&00,&00,23,231,&5A,&42,&7E,&7A,&3A,&3A,&3A,&3A,23,232,&00,&00,&00,&00,&00,&00,&00,&00,23,233,&00,&00,&00,&00,&00,&00,&00
2390VDU 23,234,&3A,&3A,&3A,&3A,&3A,&3A,&00,&3D,&3E,23,235,&00,&00,&00,&00,&00,&00,&00,&C0
2400ENDPROC
2410DEF PROCinst:*FX21,0
2420VDU26,17,129,12,28,1,29,18,2,17,128,12,26,28,2,27,17,4,17,130,12,26
2430VDU17,3:PRINTTAB(7,5);CHR$(250)+CHR$(251)+CHR$(252)+CHR$(251)+CHR$(253)+CHR$(254)
2440VDU17,3:PRINTTAB(3,7);"Your reactions";TAB(5,9);"and quick";TAB(3,11);"thinking must";TAB(2,13);"be at their best"
2450COLOUR0:PRINTTAB(2,16);"You have 4 moves":PROCswepchars2:PRINTTAB(6,17);man$:PROCchikchars2:PRINTTAB(11,18);man$:PROCkickchars2:PRINTTAB(6,23);man$:PROCsomchars2:PRINTTAB(11,23);man$
2460VDU17,129,17,3:PRINTTAB(4,30);"PRESS SPACE":PROCtune:VDU26,17,130,28,2,27,17,6,12,26
2470VDU17,0:PRINTTAB(3,7);"KEYS":PROCstance:VDU17,3:PRINTTAB(5,9);man$:PRINTTAB(9,9);"- CTRL";TAB(9,10);"- A";TAB(9,11);"- S";TAB(9,12)

```

```

);"- X"
2480VDU17,1:PROCstance:PRO
Ccaller:PRINTTAB(5,16);"RET
URN";TAB(5,17);"J";TAB(5,18
);":":TAB(5,19);"/";TAB(12,
16);man2$
2490VDU17,0:PRINTTAB(2,22)
;"W/Q SOUND/QUIET";TAB(2,2
4);"F/R FREEZE/REST"
2500PROctune:@X=1234567;RI
N
2510ENDPROC
2520DEFPROCfreeze
2530B$=INKEY$(0):IFB$="R" T
HENENDPROC
2540GOTO2530
2550ENDPROC
2560DEFPROCtune:VDU23,1,0;
0;0;0;
2570RESTORE2650:REPEAT
2580L$=INKEY$(0):IFL$=" " T
HENENDPROC
2590IFL$="Q" THEN*FX210,1
2600IFL$="W" THEN*FX210,0
2610READPX,LX,WX:SOUND2,1,
PX-20,LX:SOUND1,1,PX,LX
2620FORFX=1TOWX:NEXT
2630UNTILWX=1600
2640GOTO2570
2650DATA140,3,2100,140,3,2
100,145,2,1200,156,2,1300,1
48,2,1200,139,2,1300,134,8,
4500,144,3,2100,144,3,2100,
160,7,3100,145,2,1300,135,6
,4500,155,3,2100,155,3,2100
2660DATA160,2,1200,171,2,1
300,163,2,1200,154,2,1300,1
49,8,4500,159,3,2100,159,3,
2100,175,7,3100,160,2,1300,
150,1,1000,152,1,400,150,1,
400,147,2,1100,147,2,1300,1
34,2,1100,134,2,1200,127,2,
1100,127,2,1600
2670ENDPROC
2680DEFPROCtwiddle
2690RESTORE2750:REPEAT
2700READnoX,leX,waX
2710SOUND2,1,noX-23,leX:SO
UND1,1,noX-3,leX
2720FORDX=1TOWaX+200:NEXT
2730UNTILwaX=2000
2740ENDPROC
2750DATA150,1,1000,152,1,4
00,150,1,400,147,2,1100,147
,2,1300,134,2,1100,134,2,12
00,127,5,2000

```

38 ELECTRON USER November 1985

DEFUSE!

F. JAMES McPHERSON
has assigned you to a
very dangerous task...

IN the game of Defuse you are in a terrorist house in which a bomb has been hidden inside a bag. Unfortunately, there are quite a few bags left inside the house – and your job is to locate the one with the bomb inside.

To check for a bomb all you have to do is run over the bag with your metal-detector and it will tell you if the bomb is contained within the bag.

However, the terrorists have positioned a number of booby-traps in the house.

Luckily for you these have been located and marked with flags, but if you hit one it will explode.

Added to your problems

is the fact that you only have 20 seconds in which to find the bomb before it explodes.

An explanation of how to play the game and the controls used are also included within the program. The controls are:

Z left
X right
* up
? down



PROCEDURES

- Setup** Chooses the colours and prints the writing. Uses the data from lines 1370-1390 and PROCroom to draw the house. Prints the flags and bags randomly. Chooses the random position of the bomb.
- move** The main procedure. Moves the character around the screen according to the keyboard entries, and checks if you have hit a flag or bag.
- room()** Draws a room with top left and bottom right coordinates at XR1%, YR1%, XR2% and YR2%.
- end** Called once the game is over. Prints the ending lines and asks if you want another game.
- doneit** Called once the bomb is found, pauses and makes sound effects, then moves on to the next screen.
- intro** Uses DATA from lines 2190-2270 and prints it in the centre of a specified line in a random colour.
- d** Asks you to "Press any key" and clears the screen.

VARIABLES

- H%** Hiscores.
S% Score.
G% Number of bags.
X% & Y% Coordinates of player.
J% & K% Text coordinates of player.
D% & E% Coordinates of player before it moved.
RX% & RY% Randomly-chosen coordinates for the bag and the flags.
XB% & YB% Coordinates of the bag with the bomb in it.
L% Colour of the point the player has just moved to.

**Listing starts
on Page 42**



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Defuse listing

From Page 39

```

10REM *****
20REM Bomb disposal
30REM By James McPherson
40REM (c) Electron User
50REM *****
60REM
70REM
80IF HX<100 THEN HX=100
90MODE1
100VDU 23;8202;0;0;0;
110PROCIntro
120MODE1
130ENVELOPE 1,2,2,86,57,1
5,25,25,126,0,0,-3,126,126
140ENVELOPE 2,3,-1,32,64,
200,40,40,126,0,0,0,50,50
150ENVELOPE 3,1,0,127,65,
50,50,50,126,0,0,-8,126,126
160ENVELOPE 4,1,50,3,106,
1,1,1,126,0,0,0,126,126
170SX=0
180GX=5
190VDU 23;8202;0;0;0;
200XX=0:YY=0
210VDU 23,225,0,24,36,36,
255,255,255,255
220VDU 23,226,192,192,192
,192,192,192,192,192
230VDU 23,227,0,48,60,63,
60,48,0,0
240VDU 23,229,0,96,96,64,
120,68,162,167
250VDU 23,230,66,129,66,6
0,66,129,66,60
260VDU 23,231,68,42,17,17
,17,17,42,68
270VDU 23,232,131,6,12,24
,48,96,64,0
280VDU 23,255,255,255,255
,255,255,255,255,255
290FLAG$=CHR$5+CHR$18+CHR
$8+CHR$2+CHR$226+CHR$8+CHR$
18+CHR$8+CHR$1+CHR$227+CHR$
4
300PROCsetup
310PROCmove
320END
330:
340:
350DEF PROCsetup
360COLOUR 129:CLS
370VDU 28,1,30,38,5
380COLOUR 128:CLS
390VDU 26
400VDU 19,0,4,0,0,0
410VDU 19,3,4,0,0,0
420PRINT TAB(7,2);"Time l
eft:"
430PRINT TAB(28,2);"Score
:"
440PRINT TAB(30,3);SX
450PRINT TAB(15,0);"Hisco
re:"HX
460RESTORE
510FOR QX=1 TO 25
520RX=(RND(37)+1)*32:RY
=(RND(20)+2)*32-4
530IF POINT(RX,RY)<>0
THEN GOTO 520
540MOVE RX,RY:PRINT ;FL
AG$;
550NEXT
560GCOL 0,3
570VDU 5
580FOR QX=1 TO 6X
590RX=(RND(36)+2)*32:RY
=(RND(24)+2)*32-4
600IF POINT(RX,RY)<>0
THEN GOTO 590
610MOVE RX,RY:VDU 225
620NEXT
630VDU 4
640COLOUR2:COLOUR 129
650FOR QX=5 TO 30
660PRINT TAB(1,QX);CHR$23
0:
670PRINT TAB(30,QX);CHR$2
30:
680NEXT
690PRINT TAB(1,5);STRING$
(37,CHR$231);
700PRINT TAB(1,30);STRING
$(37,CHR$231);
710RESTORE 1420
720COLOUR 128
730REPEAT:READ Q,W
740PRINT TAB(Q-1,W);" "
;
750PRINT TAB(Q,W-1);" ";
760PRINT TAB(Q,W+1);" ";
770UNTIL W=29
780RESTORE
790REPEAT
800READ Q,W,E,R
810PROCroom(Q,W,E,R)
820UNTIL E=38 AND R=30
830RESTORE 1420
840COLOUR 2:COLOUR 128
850REPEAT
860READ Q,W
870PRINT TAB(Q,W);CHR$232
;
880UNTIL W=29
890XB=(RND(36)+2)*32:YB
=(RND(24)+2)*32
900IF POINT(XB,YB-4)<>0
THEN GOTO 890
910VDU 5:MOVE XB,YB-4:V
DU 225:VDU 4
920VDU 19,3,7,0,0,0
930ENDPROC
940:
950:
960DEF PROCmove
970TIME=0:TIX=0
980XX=16*32:YY=XX+28
990JX=XX DIV 32:KX=(1020-
YY) DIV 32
1000VDU 5
1010VDU 4
1020GX=0
1030WX=XB:IX=YB
1040REPEAT
1050IF TIME>TIX THEN GOSUB
1160
1060DX=JX:EX=KX:JX=JX+INKE
Y(-98)-INKEY(-67):KX=KX+INKE
Y(-105)+INKEY(-73):XX=JX*3
2:YY=(32-KX)*32
1070LX=POINT(XX,YY-28):IF
LX=2 AND (JX<>DX OR KX<>EX)
THEN PROCend
1080IF LX=3 THEN GOSUB 120
0
1085IF DX<>JX OR EX<>KX TH
EN SOUND RND(3),3,50,1
1090PRINT TAB(DX,EX);" "
1100IF LX=1 THEN JX=DX:KX=
EX
1110PRINT TAB(JX,KX);CHR$2
29
1120IF XX=WX AND YY=YY THE
N PROCdoneit
1130UNTIL TIME>3000
1140PROCend
1150ENDPROC
1160TIX=TIME+100
1170PRINT TAB(10,3);" ";30
-(TIME DIV 100);" "
1180IF TIME>2500 AND TIME<
2600 THEN SOUND 2,2,150,1
1190RETURN
1200PRINT TAB(JX,KX);" ":
SX=SX+5:PRINT TAB(30,3);SX:
SOUND 1,1,0,1:RETURN
1210:
1220:
1230DEF PROCroom(XR1X,YR1X
,XR2X,YR2X)
1240COLOUR 2:COLOUR 129
1250FOR QX=XR1X TO XR2X
1260PRINT TAB(QX,YR1X);CHR
$231
1270PRINT TAB(QX,YR2X);CHR
$231
1280NEXT
1290FOR QX=YR1X TO YR2X
1300PRINT TAB(XR1X,QX);CHR
$230
1310PRINT TAB(XR2X,QX);CHR
$230
1320NEXT
1330COLOUR 3:COLOUR 128
1340ENDPROC
1350:
1360:
1370DATA 1,5,14,14,1,18,13
,22,1,22,9,30,9,22,13,30
1380DATA 17,5,26,11,17,11,
26,17,29,5,38,14,31,17,38,2
6
1390DATA 17,22,24,30,24,22
,28,26,24,26,38,30
1400:
1410:
1420DATA 14,13,17,10,29,6,
37,17,13,21,10,22,25,26,30,
26,3,22,17,15,9,29
1430:
1440:
1450DEF PROCend
1460SOUND 2,-15,200,2
1470IF LX=2 THEN XB=XX:YB
=YY
1480SOUND 0,-15,4,25
1490FOR QX=1 TO 40
1500GCOL 0,RND(3)
1510MOVE RND(1000)+100,RND
(700)+100:DRAW XB+16,YB-1
6
1520NEXT
1530FOR W=1 TO 2000:NEXT
1540*FX15,0
1550VDU 4:PRINT TAB(5,31);
"Press any key to continue"
::A=GET
1560IF SX>HX THEN HX=SX
1570CLS
1580COLOUR 131:COLOUR 1
1590IF HX=SX THEN PRINT TA
B(7,12);"Congratulations y
ou have"TAB(7,13);"scored
a hiscore of ";HX;".TA
B(7,14)"BUT,"
1600PRINT TAB(7,15);"Unfor
tunately you have just"TAB(
7,16);"lost your job in a r
ather"TAB(7,17)"violent way
."
1610PRINT TAB(7,29);"Press
any key to continue"
1620*FX15,0
1630A=GET
1640CLS:PRINT TAB(3,10);"D
o you want another game <Y/
N>?"
1650A$=GET$
1660IF A$="N" THEN CLS:END

```



```

1670CLEAR:GOTO 120
1680END
1690ENDPROC
1700:
1710:
1720DEF PROCdoneit
1730SOUND 2,3,100,9
1740FOR W=1 TO 150:NEXT
1750TX=TIME
1760FOR W=1 TO ((31-TX)/100)
*20) STEP 24
1770SZ=SZ+24
1780PRINT TAB(30,3);SZ
1790SOUND 3,-15,W/3,1
1800NEXT
1810FOR W=1 TO 200:NEXT
1820*FX15,0
1830GX=GX+5
1840CLEAR:GOTO 200
1850ENDPROC
1860:
1870:
1880DEF PROCintro
1890VDU 19,0,4,0,0,0
1900RESTORE 2190
1910PWX=0
1920READ A$,H

```

```

1930IF H=2 THEN PRINT"":G
OTO 1920
1940IF H=3 THEN PROCd:PRIN
T TAB(0,0);:GOTO 1920
1950IF H=5 THEN ENDPROC
1960RX=RND(3):COLOUR RX
1970A$=A$+" "
1980REPEAT
1990B$=MID$(A$,PWX,37)
2000PWX=PWX+37
2010REPEAT
2020PWX=PWX-1
2030B$=LEFT$(B$,LEN(B$)-1)
2040UNTIL RIGHT$(B$,1)=" "
OR LEN(B$)=0
2050IF H=0 THEN PRINT TAB(
(38-LEN(B$))/2);" ";B$:GOTO
2070
2060PRINT TAB((37-LEN(B$)
/2);" ";B$
2070UNTIL LEN(B$)=0
2080GOTO 1910
2090ENDPROC
2100:
2110:
2120DEF PROCd
2130PRINT TAB(5,29);" Pr

```

```

ess any key to continue"
2140*FX15,0
2150A=GET:CLS
2160ENDPROC
2170:
2180:
2190DATA "",2,"",2,"",2,Bo
mb Disposal,1,By,1,James Mc
pherson,1,"",3
2200DATA "",2,Bomb Dispos
al,1,1,"",2,"In this game you
are a member of a bomb disp
osal team.",0
2210DATA "You have managed
to find a terrorist hide-o
ut, in this house there are
many booby-traps, all of w
hich your team mates have f
ound and marked with a flag
. However, if you touch o
ne of these traps, BANG !!"
,0
2220DATA "",3,"",2,"Bomb d
isposal",1,"",2,"Your job i
s to locate a bomb which ha
s been left inside a bag wi
thin the house, however, th

```

```

ere is more than one bag, b
ut only one of them has the
bomb inside it",0
2230DATA "Added to your pr
oblems is the fact that you
only have 20 seconds to fi
nd the bag with the bomb in
it.",0
2240DATA "To find out if a
bag contains the bomb, all
you have to do is run over
it with your metal detecto
r, and if it does not conta
in the bomb the bag is remo
ved",0
2250DATA "",3
2260DATA "",2,"C O N T R O
L S",1,"",2,"Z.....
.....left",0,"X.....
.....right",0,"*.....
.....up",0,"?.....
.....down",1
2270DATA "",3,END,5

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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Tales from the ROM room

NATURAL history buffs say animals have a sixth sense that warns of impending disaster.

Bunnies abandon their burrows days before an earthquake, while birds steer clear of simmering volcanoes.

It appears that these dumb animals have a sense of survival denied to us human beings.

Knowing all this I should have been forewarned when, as I entered the portals of Database House early one afternoon, I was confronted with a sprinting Roland Waddilove.

"Can't stop", he panted as he rushed past, "got to get a towbar for my bike".

With that he jumped on to his Kawasaki and was roaring off up the road before he'd even started the engine.

Being the philosophical sort I put this strange behaviour down to too much reading of the Sun - "I get it for the pictures" - and proceeded into the Editorial Offices.

If only you could see them, tastefully decorated in early Boddington's Gothic. They resemble nothing so much as the tap-rooms of our youth where, years ago, we used to spend our time hunched up over our manuals debating how best to use 1k.

Everywhere is the smell of stale beer and overheating ZX81s.

Yes, the editor was in and he was wearing his usual aftershave.

"Ah, Peters", he screamed, "good to see you. I need a man like you. I've decided to write a program".

Now I knew the reason behind Waddilove's Retreat, as his latest game is called. My stomach churned sickeningly as I recalled the editor's previous attempts.

The worst was probably the 48-hour marathon session as he attempted to debug

**10 PRINT "Hello"
20 GOTO 10**

followed closely by the time he confused Pascal with Logo and kept producing triangles of numbers.

"Are you sure, sir?" I gibbered, remembering when

he'd said that the modem wasn't working because the wire wasn't tight enough.

"Yes, I'm sure. And it's going to be in machine code".

Have you ever had one of those dreams where the ground suddenly opens up beneath you and you wake up with a jolt? The editor's pronouncement had the same effect on me without the relief afforded by returning consciousness.

"Are you sure sir?" I repeated.

"Yes, and you're going to help".

Cursing Waddilove for his lack of warning, I resigned myself to my fate and leant forward over his dusty micro, reaching for the on switch of the wall socket. My hand was brutally slapped aside.

"Off it. I know where the on switch is. Go and sit in the corner until I need you".

I made my way across the litter-strewn floor to the indicated desk and swept aside what I thought was a pile of dirty rags.

"Leave me alone", it hissed. I looked closer and saw the editor's brother, erstwhile editor of *The Micro User*, doing his famous impression of Clive Sinclair on a bad day.

"He doesn't know I'm here. In fact I'm not sure he knows he's here. Just sit quietly until you get a chance to sneak out".

It seemed the best advice, so I settled down, resigned to my fate. In the interests of propriety I will draw a veil over the rest of the day.

It is not my place to mention the four hours spent until he realised that the micro wasn't plugged in.

Why jeopardise the editor's already fading credibility by revealing the hours he spent trying to find someone with 16 fingers?

No, loyalty to Database forbids. But it won't stop me strangling Waddilove when I see him.

Yours,

Nigel Peters

See us at
Manchester Show

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- ★ 2 from 9 substitutes (the FA tells us so).

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JUDGING by the number of letters we receive, many Electron users are quite envious of the BBC Micro's Mode 7.

It's an extremely useful mode, due to the small amount of RAM – random access memory – taken up. Its excellent range of colour and simple graphics can be used to create quite interesting displays.

Unfortunately, Mode 7 isn't possible on the Electron. This means that long adventures which must run in Mode 6, the most economical in memory terms, are restricted to two colours – usually black and white.

The trouble is that title pages and instructions look drab and uninteresting in Mode 6. If you want a bit of colour to liven them up, the only solution is to switch to Mode 1.

This, however, allows only four colours and a massive 20k is consumed for the display leaving little for your program.

Can anything be done?

While we can't reproduce Mode 7, we can improve Mode 6.

Using a bit of machine code we can produce an eight-colour Mode 6 and by defining a few graphics a Teletext-type display should be possible.

Enter and run the demonstration program. You'll find that it prints a simple message in seven different colours in Mode 6. The eighth colour is the black background.

Try listing the program and you'll see that whatever is on the top two lines is red, the

How to fake Mode 7

First in a two-part exploration of the ULA by ROLAND WADDILOVE

next two are green, then yellow and so on.

It's not possible to have more than one colour on a line unfortunately, but, as you can see it's still very effective.

Let's see how it works.

The two Mode 6 colours, COLOUR 0 and COLOUR 1 can be redefined to any one of the eight steady or eight flashing colours using VDU 19. So, by switching the palette very quickly we can create the illusion of a multicolour mode.

Even though the colours are constantly being redefined you won't see any flicker because of the way it's done.

What the program does is to wait until the start of each TV frame, then, as the picture is built up, line by line, the colours are switched.

Using simple delay loops these colour changes are

made to occur during the two blank scan lines between each character row on the Mode 6 screen, hence avoiding flicker.

The routine is called at the beginning of every TV frame by setting the event vector at &220/&221 to point to the start of the code.

The start of vertical synchronisation of screen display event is enabled with *FX14,4. *FX13,4 disables it.

You won't find any VDU 19s in the program. Using them could upset the running of the foreground program and it's too slow anyway. To avoid this the ULA is written to directly.

The registers in the ULA responsible for colours 0 and 1 in two colour modes are &FE08 and &FE09. When either colour 0 or colour 1 is redefined using VDU 19 these two registers are reprogram-

med.

So it we reprogram these we get the effect of VDU 19.

Not all of the 16 bits in the two bytes are used. Three bits are combined to produce COLOUR 0 and three bits are used to produce COLOUR 1. The other ten are ignored.

The three bits for each colour determine which of the three primary colours – red, green and blue – are to be switched on.

By using these, singly or mixed together, the seven colours can be produced. The eighth is black, which is simply an absence of colour.

Figure 1 shows which bits are used for each colour.

When a bit contains a 1, it means that the colour linked to that bit is turned off, and if the bit holds 0, it means the relevant colour is turned on.

To set COLOUR 0 to blue and COLOUR 1 to yellow &FE08 should be set to 64 and &FE09 to 17.

Enter:

?&FE08=64: ?&FE09=17

If you look at the bit pattern, green and red are off for COLOUR 0 leaving the blue on, so the background is blue. Blue is turned off for COLOUR 1 and red and green turned on. Red and green when mixed produce yellow, so the text is yellow.

Any combination of two colours can be displayed using this method.

It's not difficult once you get the hang of it – try working out a few colour combinations and poking the values into the two registers.

The worst that can happen

```
10REM Mode 6 Colours
20REM By R.A.Waddilove
30REM (c) Electron User
40MODE 6
50PROCassemble
60FOR n=1 TO 7
70PRINT "This is Mode 6
Colour...";n
80NEXT
90END
100
110DEF PROCassemble
120*FX13,4
130*FX16
140FOR pass=0 TO 2 STEP 2
```

```
150PZ=&900
160[ OPT pass
170PHP:PHA:TXA
180PHA:TYA:PHA
190\Red
200LDA #04:STA &FE08
210LDA #17:STA &FE09
220LDX #160:JSR pause
230\Green
240LDA #08:STA &FE08
250LDA #21:STA &FE09
260LDX #41:JSR pause
270\Yellow
280LDA #08:STA &FE08
290LDA #17:STA &FE09
```

```
300LDX #40:JSR pause
310\Blue
320LDA #20:STA &FE08
330LDA #21:STA &FE09
340LDX #42:JSR pause
350\Magenta
360LDA #20:STA &FE08
370LDA #17:STA &FE09
380LDX #41:JSR pause
390\Cyan
400LDA #16:STA &FE08
410LDA #21:STA &FE09
420LDX #41:JSR pause
430\White
440LDA #16:STA &FE08
```

```
450LDA #17:STA &FE09
460PLA:TAY:PLA
470TAX:PLA:PLP
480RTS
490
500.pause
510LDY #5
520.loop
530DEY:BNE loop
540DEX:BNE pause
550RTS
560]
570NEXT
580?&220=&00: ?&221=&09
590*FX14,4
600ENDPROC
```


is both colours ending up the same. Green text on a green background is liable to induce eye-strain...

The example program shows the data required to produce each of the eight colours on a black background.

There is a short delay loop between each colour. Altering this, by changing the value in the X register before *pause* is

called, alters the size of the colour band. The longer the delay, the bigger the band of colour.

One important point to remember is that the more colour changes and delay loops there are the slower the Electron will run.

Still, speed isn't essential in adventure games, title pages and instructions, so it doesn't

matter.

The teletext graphics I'll leave to you. All you need to do is to define a few characters using VDU 23 and print them on the screen. Then add the colour using a routine similar to the one here.

Finally, does it work in the other two colour modes, 0, 3 and 4? Try it and see! Who needs Mode 7 now?

Programming

THE ULA

Part One

&FE08		
128	X	
64		Blue - COLOUR 1
32	X	
16		Blue - COLOUR 0
8	X	
4		Green - COLOUR 1
2	X	
1	X	

X means
bit value
irrelevant

&FE09		
128	X	
64	X	
32	X	
16		Green - COLOUR 0
8	X	
4		Red - COLOUR 1
2	X	
1		Red - COLOUR 0

Figure 1: ULA registers FE08 and FE09

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Our other three adventures have also received superb reviews in Electron User. They each contain approximately 230 locations and 25,000 characters of text.

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.....qty THE KINGDOM OF KLEIN	£7.95	£9.95	No Graphics on Electron

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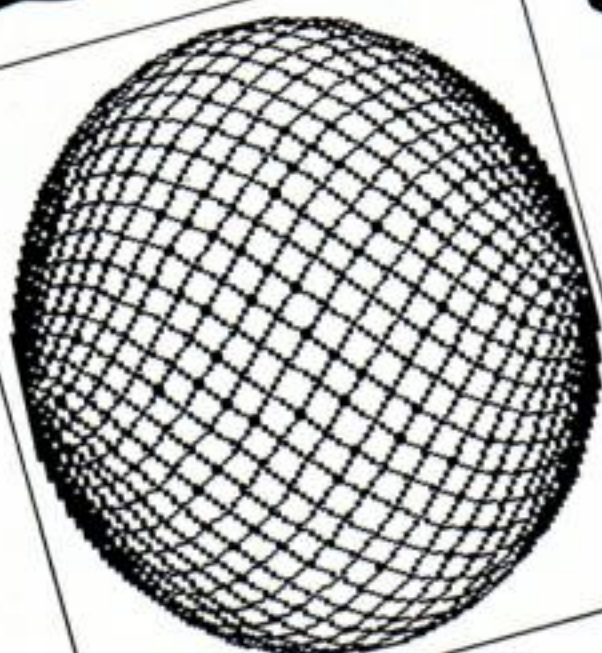
SCRAPBOOK

SCRAPBOOK is the feature that contains a selection of all the short, simple programs sent in by our readers.

It's where we keep a record – our scrapbook – of all the interesting little routines that don't end up in the Notebook or in Program Probe but are too good for us not to share.

This month it's very much a graphics show. Next month – who knows? It's up to you.

So if you enjoy messing about with your Electron and want to share your discoveries with other Electron users, send them in to us.



*This doesn't use strings
from J. Price*

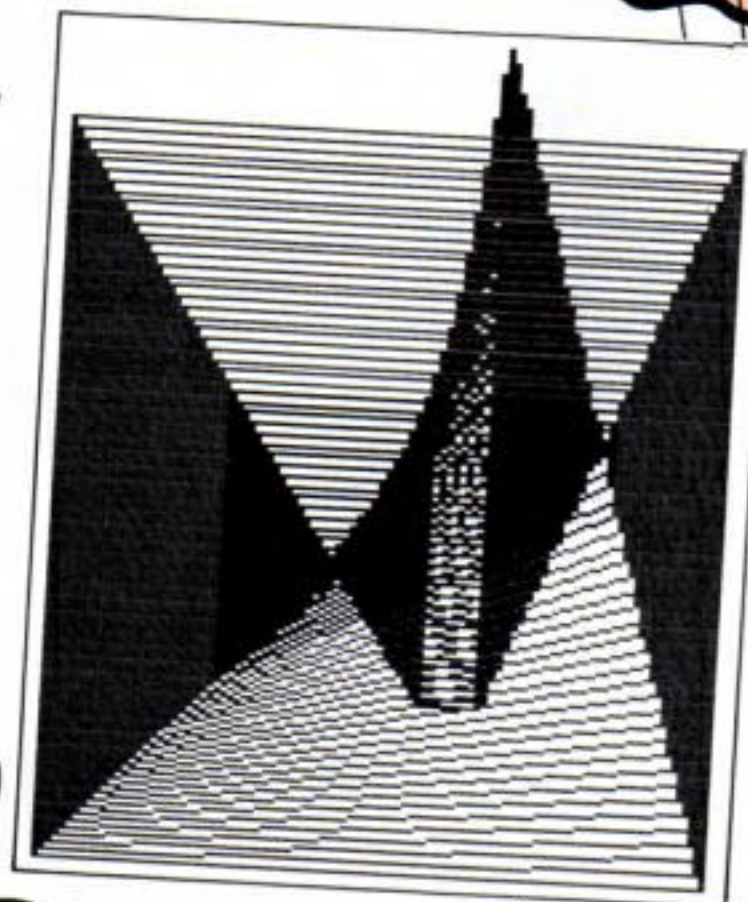
```
10 REM Ball of Wool
20 REM By J. Price
30 MODE 5
40 VDU 5
50 GCOL 0,RND(3)
60 SZ=400
70 VDU 29,640:512:
```

```
75 MOVE 0,0
80 FOR A=0 TO 125.7 STEP
0.1
90 DRAW SX*SIN(A),SY*
COS
(A)*SIN(A*0.95)
100 NEXT
110 REPEAT UNTIL FALSE
```

*Squares or Peaks
by Paul Heath*

```
10 REM **SQUARES**
20 REM **By Paul Heath**
30 REM
40 MODE 5
50 VDU 23,1,0;0;0;0;
60 AA=RND(20):BB=RND(20)
:CC=RND(20):DD=RND(20)
70 FOR N=3 TO 0 STEP -1
80 A=100:B=900:C=100:D=9
00
```

```
90 REPEAT
100 GCOL 0,N
110 MOVE A,A:DRAW A,B:
DRAW
D,B:DRAND,C:DRAW A,A
120 A=A+AA:B=B-BB:C=C+CC:
D=D-DD
130 UNTIL A>12700RB<00RC>
10000RD<0
140 NEXT
150 GOTO 60
```



Send your programs to
Scrapbook, *Electron*
User, 68 Chester Road,
Hazel Grove, Stockport
SK7 5NY.

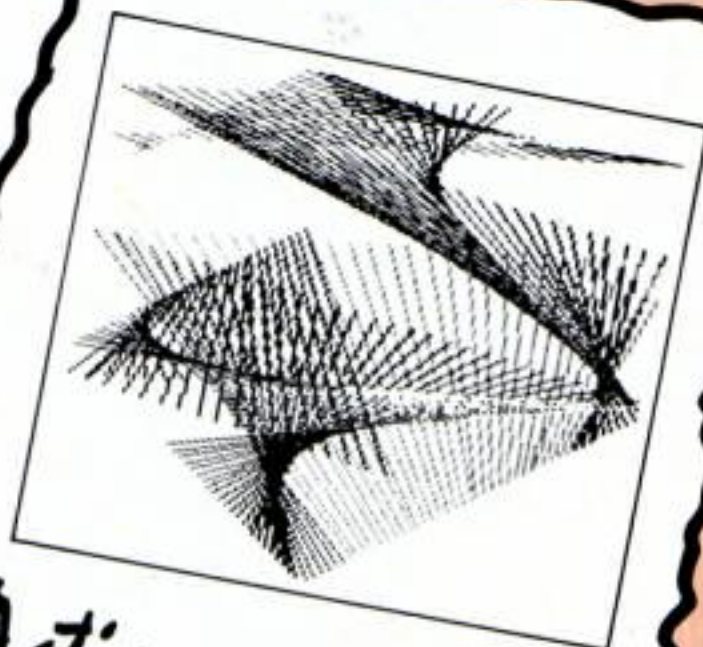
Going Round.. and Round by Chris Jones



```

10 REM Circles
20 REM By Chris Jones
30 MODE 2
40 REPEAT
50 PROCcircle(RND(1279),
RND(1023),RND(300),RND(8)-1
)
60 UNTIL FALSE
70 DEF PROCcircle(X,Y,R,
C)
80 GCOL 0,C
90 LOCAL I,J
100 FOR I=Y-R TO Y+R STEP
-8
110 J=SQR(ABS(R*R-(I-Y)*(
I-Y)))
120 MOVE X-J,I
130 DRAW X+J,I
140 IF I<0 THEN CLEAR:GOT
0 40
150 NEXT
160 ENDPROC

```



from C.R.L. Morgan Hypnotic Graphics Action

```

10 REM LINEBOUNCE
15 REM C.R.L.Morgan
20 MODE2:GX=1:GCOL0,GX
30 VDU23,1,0;0;0;0;0;
40 X1X=RND(1279):Y1X=RND
(1023):X2X=X1X+RND(25)-50:Y
2X=Y1X+RND(25)-50
50 AX=RND(75)-50:BX=RND(
75)-50:CX=RND(75)-50:DX=RND
(75)-50
60 REPEAT
70 MOVEX1X,Y1X
80 DRAWX2X,Y2X
90 IF GX>6 OR GX<0 THEN
GX=0
100 X1X=X1X+AX
110 IF X1X>1279 OR X1X
<=0 THENAX=-AX:GX=GX+1:GCOL
0,GX
120 Y1X=Y1X+BX
130 IF Y1X>1023 OR Y1X
<=0 THEN BX=-BX:GX=GX+1:GCO
L0,GX
140 X2X=X2X+CX
150 IF X2X>1279 OR X2X
<=0 THEN CX=-CX:GX=GX+1:GCO
L0,GX
160 Y2X=Y2X+DX
170 IF Y2X>1023 OR Y2X
<=0 THEN DX=-DX:GX=GX+1:GCO
L0,GX
180 UNTILINKEY(-99)
190 RUN

```


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Micro Messages

Azimuth is the angle to check

DO your readers have trouble with cassette loading? I suspect so. Here is a hint which will prove invaluable and save many frustrating hours with DATA and BLOCK errors.

I have two tape cassettes that have gradually given more and more trouble with loading errors. The cause I found is the azimuth misalignment of the heads.

Azimuth is the angle at which the tape passes the head, and it is important that this is correct.

Most cassettes have a small hole in the case just in front of the cassette door through which you can adjust the azimuth with a small Phillips/Pozi screwdriver, as follows:

Method 1: Listen to a previously known good tape and adjust the screw for a peak in sound, then try loading the tape. If you still have problems try:

Method 2: Start loading a tape into the Electron and tweak the screw for error free loading.

The azimuth setting does tend to drift on most recorders and may need adjusting when you start to get trouble with loading. — **Trevor L. Roberts, North Ascot.**

● Thanks for the tape tips.

The ROM connection

THERE is a ROM program in chip form that I would like to get to use with the Electron.

For my usage it is not worth buying a ROM box extension at four times the price of the chip.

Is there any other way that I can use it in conjunction with the Electron and existing Plus 1? Is there such a thing as a board that can be inserted in the Plus 1 ROM sockets, into which a ROM chip can be plugged?

Or would it be possible to make up a board with an edge connector to cover this, and if so where could I find the

details for the inter pin connections?

The other query is concerning the disassembler in the June 1985 issue of Electron User.

Here I am quite out of my depth. Using it on an Electron and Plus 1, with no cartridges inserted, typing in "Start Address - ?&900", as shown in the picture in the article I get:

900-FF no such code

and after tapping any key:

901-00 Brk

I have rechecked my program several times and can't find any errors. — **J.D. Renaud, Wolverhampton.**

● ACP's budget ROM adaptor should be just what you're looking for.

The disassembler is a utility for machine code programmers. If you don't understand assembly language it won't make much sense.

Elite tips

TIRED of getting killed at Elite with hardly any credits and rating? All you have to do is follow my tips.

Trading: From Lave go to Zanoce with 16 tonnes of food and 4 tonnes of textiles.

From Zanoce go to Isanor with 2 tonnes of computers.

From Isanor go to Quintar with as much liquors and wines as possible.

From Quintar go to Isanor with as many computers as possible.

Keep to the Isanor/Quintar route.

Don't buy a Galactic Hyperdrive — it's a waste of money.

This may seem like cheating, but it helps a lot. All you have to do is keep using the saving mode without using the

tape recorder unless you want to save the position.

This enables you to get killed and start again at the last space station you used it at.

This also works on BBC Elite.

Could you ask Merlin to help me with Sphinx Adventure. My problem is where is the boat and how do you get to it? — **Dennis Howell, Stoke-on-Trent.**

● Thanks for the tips Dennis. Merlin promises a special on the Sphinx.

Protek modem

WHILE staying on holiday with some relatives I was looking through a catalogue called the Look Again Big Book Autumn and Winter, 1985.

On page 730 to my amazement I noticed the following "Protek 1200 modem to fit either Spectrum 48k, Electron, CBM 64 or Amstrad computers — yes, a modem already available for the Electron.

It features two operating modes for computer to computer or from computer to teletext type database communication.

I hope this information is useful to you and other Electron User readers. — **Carlin Easton, Sutton Coldfield.**

● We've had several letters concerning the Protek modem. Unfortunately there isn't a model available for the Electron.

Software shortage

I WOULD like to point out the

lack of decent games software for the Electron — noticeably race games.

Acornsoft has told me that Revs can not be written to run on the Electron because it hasn't got the facilities to enable this. Do you know of any firm which produces a race game with curves for the Electron?

It seems companies are producing games for the BBC but are forgetting the Electron. Why is this, and what happened to Micro Power?

I would also like to add that with all the new computers coming out with 64k and more RAM it seems doubtful whether the Electron will remain popular.

Is Acorn planning a 64k version of the Electron such as they have done with the BBC? — **P.A. Phillips, Stansted.**

● Have any of our readers come across a good race game?

The only solution to the memory problem is a second processor. At the moment it's not possible to connect one to the Electron though.

Electron's future

WHY is it I have difficulty in buying Electron software in shops?

W.H. Smith and Boots in Bristol usually offer a meagre stock of very old games. It is the same throughout Bristol. Electron software is very 'thin on the ground'.

Now the Electron sells for less than £100 in most shops does this mean they don't sell well and hence less software will be available?

Although I am a staunch supporter of the Electron I do

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On the October 1985 tape:
DUNGEON QUEST An amazing all action arcade adventure. **PILOT** Computer assisted learning language. **RAVING ROLLER** Arcade action in the garden. **TRAIN** Animated action. **KALEIDOSCOPE** Colourful graphics action.

On the September 1985 tape:
TEXNDAN 3D Wild West shootout. **PINTCURSOR** Machine code graphics. **SPRITE/ED** Sprite editor. **COMPOSE** Writing music simplified. **REVERSI** Cunning strategy game. **SIMPLEFILE** Save and read data. **BOUNCE BALL** Two player action. **ROTATE** Animation in a spin.

On the August 1985 tape:
DIGGA Exciting arcade action beneath the earth. **DODGE THE ASTEROIDS** Fun deep in space among the asteroids. **M/CODE GRAPHICS** Sliding pints of beer! ***FX** The OS explored. **MOVEIT** An intriguing sliding puzzle. **HEXGRAM** An educational game to increase your word power.

On the July 1985 tape:
MANIC MOLE Machine code action at its best. **HIGHER OR LOWER** Guess the card. **TIME BOMB** Carefully collect TNT. **M/CODE GRAPHICS** Two demonstrations. **FX1/2** The OS on call. **PIRATE MATHS** Sum fun. **NOTEBOOK** Password Generator.

On the June 1985 tape:
QUASIMODO Bellringing classic. **DISASSEMBLER** Machine code utility. **ACTIVITIES** Educational fun. **REFLECT** Aggressive aliens. **ENGINE** Animation. **DODGE** Race track action. **STRINGALONG** Scrolling fun. **CASTLE** Medieval graphics. **MATHS CURVE** Angles and art. **NOTEBOOK** Trees.

On the May 1985 tape:
SKRAMBLE! Compulsive arcade action. **SHEEPNIM** The logic game. **TEXTWRITER** Screen utility. **LIFE** A cultured classic. **CEDRIC** Educational fun. **THREE-D** Outstanding utility. **SPOKES** Fascinating graphics. **MOONORBIT** Heavenly displays. **BLAZON** Heraldic devices. **FLOWERS** A Basic bouquet. **NOTEBOOK** Annotated animation.

On the April 1985 tape:
SUPER ARCHER Target practice. **BINARY SEARCH** Search data efficiently. **JOYPLUS** Switched joystick routine. **ODD ONE OUT** Educational fun. **POLYGONS** 3D rotation. **MONEY CRAZY** Arcade action. **STARCHART** The night sky. **FORTUNE TELLER** Horoscope. **COLLISION DETECTION** Alien encounters. **HILO** Guessing game. **NOTEBOOK** Hello to assembler.

On the March 1985 tape:
MR. FREEZE Ice cube arcade action. **SCREENDUMP** Two procedures for printer dumps. **FILLER** The machine code fill routine. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **PERCY** Beat the burning fuse. **ANIMATION** Two example programs. **PIGS** Flying bacon. **NOTEBOOK** Display formatting.

On the February 1985 tape:
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On the January 1985 tape:
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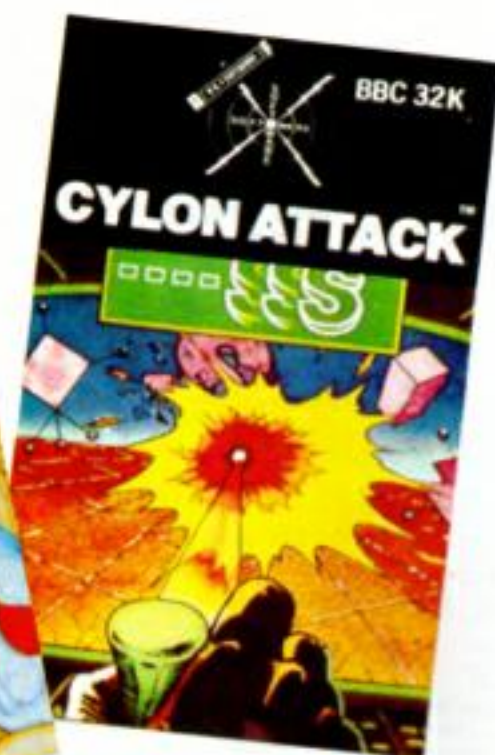
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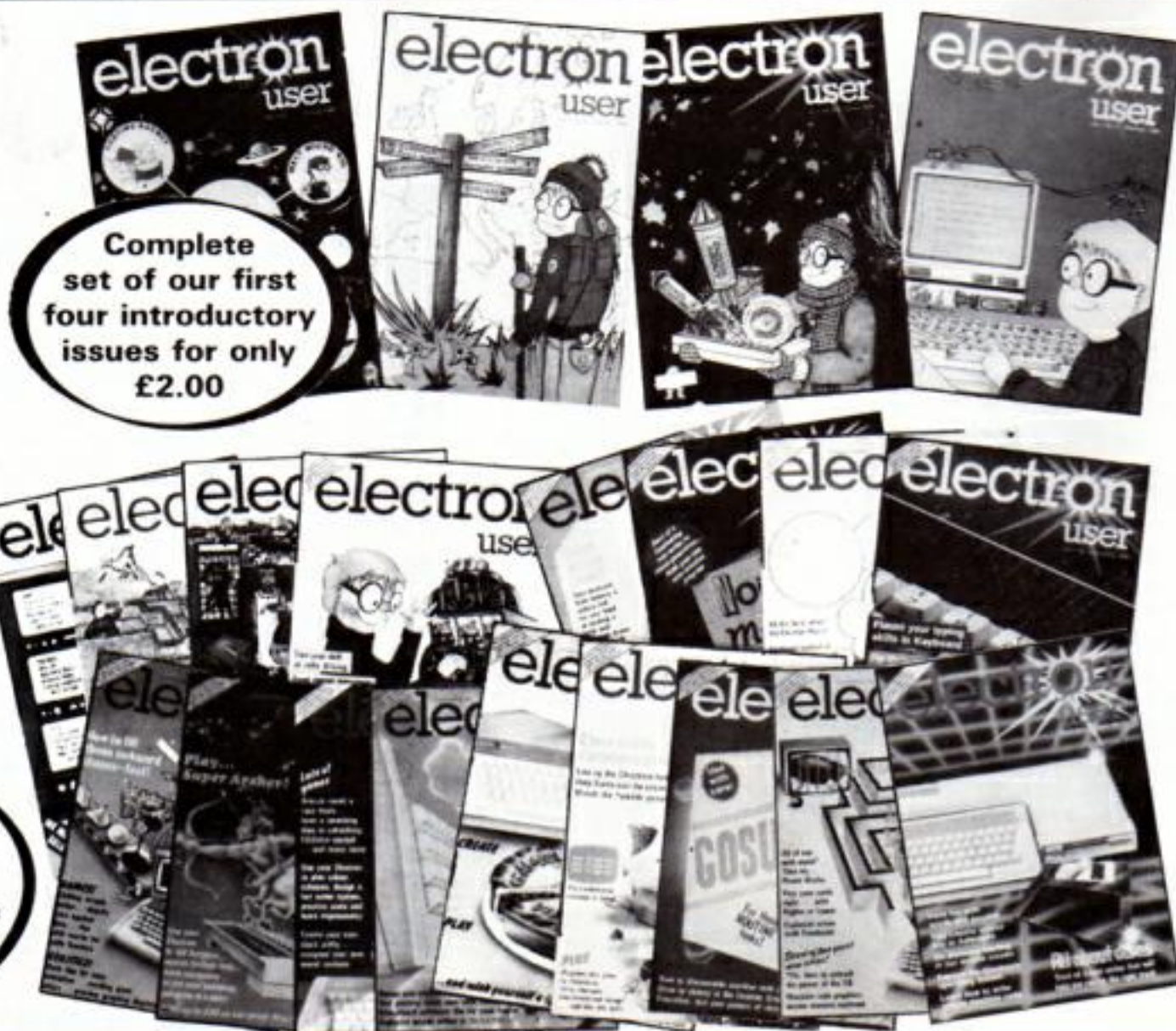
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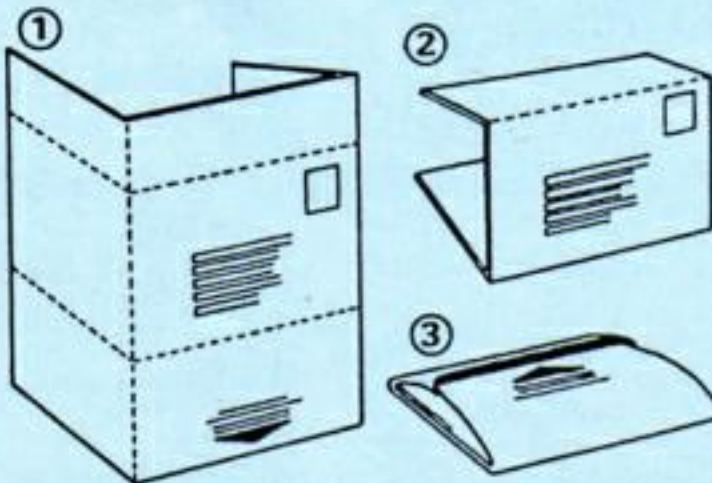
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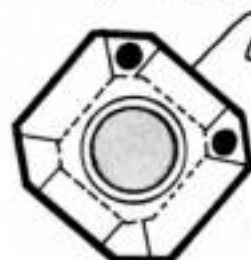
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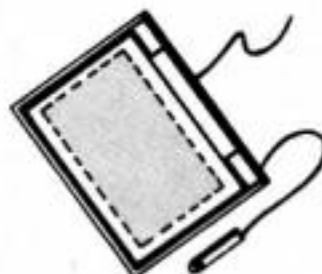
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